Anritsu

MP MASTER
MA34507

Commentary on MT8850A Operation with Issue 0.35 software

This document describes the differences between the "Operation Manual Provisional 0.1" and the MT8850A with version 0.35 software.

1. Output power measurements. This test is only implemented as a hopping ON test measuring at three frequencies; Low, Medium and high. The 0.35 user interface shows this as "Standard" mode.
2. Initial carrier freq. In hopping ON mode this test measures the next frequency hopped to. The total number of measured packets is set in the "Number of packets" field. The 0.35 user interface shows this as "Custom" mode.
3. Carrier freq drift. In hopping ON mode this test measures the next frequency hopped to. The total number of measured packets is set in the "Number of packets" field. The 0.35 user interface shows this as "Custom" mode.
4. The MT8850A signal generator defaults to 0dBm for all measurements. To set other levels it is necessary to use the "Service" menu.
   Press CONFIG\Service, now use the down arrow until the pointer is beside the "TX attenuation and gain" option, press SEL.
   Switch in the desired amount of attenuation by moving the pointers to an attenuator field and then pressing SEL.
   Press the SEND soft key to action the new attenuator settings.
5. Error messages "Via RF Comm 56" and "Via RF Comm 5A".
   This message is displayed when the EUT does not respond with an end event message at the end of a measurement sequence. The MT8850A will not handle this error in a controlled manor until version 0.4. Until release of 0.4 software, it is necessary to cycle the power to the MT8850A to clear this error.

MT8850A Software Release Plan

	Issue 0.35 20th April	Issue 0.40 11th May	Issue 0.50 25th May	Issue 1.0 June
Measurements				
Output power	Yes	Yes	Yes	Yes
Initial carrier freq	Yes	Yes	Yes	Yes
Carrier drift	Yes	Yes	Yes	Yes
Single sensitivity	Yes	Yes	Yes	Yes
Multi sensitivity	Yes	Yes	Yes	Yes
Max input power	Yes	Yes	Yes	Yes
Modulation	No	No	Yes	Yes
Power control	No	No	No	Yes
Null packets	Yes	Yes	Yes	Yes
Loopback	Yes	Yes	Yes	Yes
TX mode	Yes	Yes	Yes	Yes
Hopping ON	Yes	Yes	Yes	Yes
Hopping OFF	Yes	Yes	Yes	Yes
MT8850A sig gen				
Calibration	Yes	Yes	Yes	Yes
MMI level control	No	Yes	Yes	Yes
Dirty TX	No	No	Yes	Yes
Sig gen mode	No	Yes		
MT8850A receiver				
Calibration	Yes	Yes	Yes	Yes
Autoranging	Yes	Yes	Yes	Yes
Features				
Establish link with EUT	Yes	Yes	Yes	Yes
EUT into test mode	Yes	Yes	Yes	Yes
Inquiry	No	Yes	Yes	Yes
Run script	Yes	Yes	Yes	Yes
Run single	Yes	Yes	Yes	Yes
Abort test/script	No	Yes	Yes	Yes
Limits	No	Yes	Yes	Yes
Path loss tables	No	No	Yes	Yes
Sensitivity FER detail	No	Yes	Yes	Yes
External std	Yes	Yes	Yes	Yes
Status messages	50%	Yes	Yes	Yes
Error messages	40%	Yes	Yes	Yes
Remote control				
GPIB	50%	50%	75%	100%
RS 232	No	No	No	100%

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_10220

MT8850A Bluetooth Test Set

Operation Manual

Anritsu

Originated by Anritsu Ltd, EMD, Stevenage, U.K.

P/N: 13000-000109
REVISION: Provisional 0.1
CREATED APRIL 2001
COPYRIGHT 2001
ANRITSU

WARRANTY

The ANRITSU product(s) listed on the title page is (are) warranted against defects in materials and workmanship for one year from the date of shipment.

ANRITSU's obligation covers repairing or replacing products which prove to be defective during the warranty period. Buyers shall prepay transportation charges for equipment returned to ANRITSU for warranty repairs. Obligation is limited to the original purchaser. ANRITSU is not liable for consequential damages.

LIMITATION OF WARRANTY

The foregoing warranty does not apply to ANRITSU connectors that have failed due to normal wear. Also, the warranty does not apply to defects resulting from improper or inadequate maintenance by the Buyer, unauthorised modification or misuse, or operation outside of the environmental specifications of the product. No other warranty is expressed or implied, and the remedies provided herein are the Buyer's sole and exclusive remedies.

TRADEMARK ACKNOWLEDGMENTS

"The Bluetooth trademarks are owned by Telefonaktiebolaget L M Ericsson, Sweden". V Connector and K Connector are registered trademarks of ANRITSU Company. Adobe Acrobat and Acrobat Reader are trademarks of Adobe Systems Incorporated.

NOTICE

ANRITSU Company has prepared this manual for use by ANRITSU Company personnel and customers as a guide for the proper installation, operation and maintenance of ANRITSU Company equipment and computer programs. The drawings, specifications, and information contained herein are the property of ANRITSU Company, and any unauthorised use or disclosure of these drawings, specifications, and information is prohibited; they shall not be reproduced, copied, or used in whole or in part as the basis for manufacture or sale of the equipment or software programs without the prior written consent of ANRITSU Company.

SAFETY SYMBOLS

To prevent the risk of any personnel injury or loss related to equipment malfunction, ANRITSU Company uses the following symbols to indicate safety-related information. For your own safety, please read this information carefully BEFORE operating the equipment.

SYMBOLS USED IN THIS MANUAL

DANGER	Indicates a very dangerous procedure that could result in serious injury or death if not performed properly.
WARNING	Indicates a hazardous procedure that could result in serious injury or death if not performed properly.
CAUTION	Indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

SAFETY SYMBOLS USED ON EQUIPMENT AND IN MANUALS

(Some or all of the following five symbols may or may not be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.)

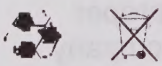
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE operating the equipment.

This symbol indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This symbol indicates a compulsory safety precaution. The required operation is indicated symbolically in or near the circle.

This symbol indicates warning or caution. The contents are indicated symbolically in or near the triangle.

This symbol indicates a note. The contents are described in the box.



These symbols indicate that the marked part should be recycled.

FOR SAFETY

Always refer to the operation manual when working near locations at which the alert mark, shown on the left, is attached. If the operation, etc. is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.

Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.

or

When supplying AC power to this equipment, connect the accessory 3-pin power cord to a 3-pin grounded power outlet. If a grounded 3-pin outlet is not available, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.

WARNING ⚠

The operator cannot repair this equipment. DO NOT attempt to remove the equipment covers or to disassemble internal components. Only qualified service technicians with knowledge of electrical fire and shock hazards should service this equipment. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision components.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

TABLE OF CONTENTS

Chapter 1. General Information *1-1*

Scope of this manual 1-1
Introduction 1-1
Identification number 1-1
Bluetooth test set options and accessories 1-1
Models 1-1
Included accessories 1-1
Options and accessories 1-1

Chapter 2. Product Overview *2-1*

About Bluetooth 2-1
The MT8850A 2-1
MT8850A features 2-1
BlueSuite support software 2-3

Chapter 3. Installation *3-1*

Introduction 3-1
Initial inspection 3-1
Power requirements 3-1
AC line power 3-1
DC power 3-1
Fuse protection 3-1
Grounding 3-1
Environmental requirements 3-2
Rack mounting 3-2
MT8850A rack mounting installation 3-2
Tools required 3-3
Assembly procedure 3-3
Storage and shipment 3-6
Preparation for storage 3-6
Environmental requirements 3-6
Preparation for shipment 3-6
Anritsu service centers 3-7

Chapter 4. Connections *4-1*

Introduction 4-1
Front panel connectors 4-1
Rear panel connectors 4-1

Chapter 5. Front Panel Operation *5-1*

Introduction 5-1
Front panel controls 5-1

Power-on-procedure 5-3
Conventions 5-3
Hard and soft keys 5-4
Hard keys 5-4
Soft keys 5-5
Choosing screen entries 5-5
Entering data through the alpha/numeric keypad 5-6

Chapter 6. Getting Started 6-1

Preparing the MT8850A for use 6-1
Running scripted tests 6-1
Running a single test 6-2
Running in null packets mode 6-3

Chapter 7. Configuring the MT8850A 7-1

Introduction 7-1
Setting up the EUT 7-3
Viewing the EUT address and user friendly name 7-3
Viewing supported features 7-4
Setting up the EUT control 7-5
Setting up Inquiries 7-6
Setting up the MT8850A 7-7
Displaying the identity of the MT8850A 7-7
Configuring the system interfaces 7-8
Setting the screen display and sound 7-9
Defining the channel pattern 7-10
Setting up the signal generator 7-10
Setting the range hold 7-11
Setting the modulation index 7-12
Null packets mode 7-12
TX power level 7-13
Setting up test script operation 7-14
System features 7-14
Setting the link 7-14
Viewing an internal communications log 7-15
Viewing an EUT communications log 7-16
Updating the software 7-16
Service 7-17

Chapter 8. Using the Script Menu 8-1

Introduction 8-1
Accessing the script menu 8-2
Locking and unlocking a script 8-3
Running the tests 8-5

Setting up general script parameters 8-6
Setting up individual tests 8-8
Setting up the output power test 8-8
Setting up the power control test 8-10
Setting up the initial carrier test 8-12
Setting up the carrier drift test 8-14
Setting up the single slot sensitivity test 8-16
Setting up the multi-slot sensitivity test 8-19
Setting up the modulation index test 8-21
Setting up the maximum input power test 8-22
Entering the BT address of the EUT 8-25
Running a single test 8-26
Viewing test results 8-27
Output power test results 8-27
Power control test results 8-27
Initial carrier test results 8-28
Carrier drift test results 8-28
Single slot sensitivity results 8-29
Multi-slot sensitivity test results 8-30
Modulation index test results 8-30
Maximum input power test results 8-31

Appendix A. Top-line Messages A-1

Introduction A-1
Message types A-1
Message priorities A-2
Error codes A-2
HCI (Host Controller Interface) EUT communication errors A-2
Message display/clear conditions A-3
HCI and Communication list of error codes A-6
Internal HCI and Communication list of error codes A-7

Appendix B. Specification B-1

Transmitter tests B-1
Receiver tests B-1
Output power B-2
Power control B-3
Modulation characteristics B-4
Initial carrier frequency tolerance B-5
Carrier frequency drift B-6
Sensitivity - single slot packets B-7
Sensitivity - multi-slot packets B-8
Maximum input level B-9

MT8850A signal generator B-10
Frequency B-10
Level B-10
Modulation B-10
MT8850A measuring receiver B-11
Frequency B-11
Level B-11
Modulation B-11
EUT control interface B-11
Frequency standard B-12
Rear panel connectors B-12
GPIB B-12
RS 232 ..... B-12
Power requirements B-12
Environmental B-12
Size and weight B-13
Ordering information B-13

Appendix C. Connector Care and Handling C-1

Chapter 1.General Information

Scope of this manual

This manual provides installation and operation information for the model MT8850A Bluetooth Test Set.

Introduction

This chapter provides information to familiarize you with the basic MT8850A Bluetooth Test Set. Included is information about the instrument identification number, models, options, and accessories.

Identification number

The MT8850A Bluetooth Test Set has an ID number affixed to the rear panel (see page 4-1). Please use the complete ID number when ordering parts or corresponding with the Anritsu Customer Service department.

Bluetooth test set options and accessories

Models

MT8850A, Bluetooth Test Set.

Included accessories

Power cord for destination country

EUT control interface lead

RS232 cable for firmware updates

Operation Manual

Remote programming manual

Certificate of Calibration

Options and accessories

MT8850A-01	Rack Mount, single instrument
MT8850A-03	Rack Mount, side-by-side
MT8850A-06	Rear Mount RF and EUT connectors
MT8850A 10	Bluetooth antenna and adapter
MT8850A-20	Spare EUT/RS232 cable
MT8850A-30	Extra Operation and Programming Manual
	LabVIEW™ Driver
D41310	Soft Carry Case with shoulder strap

Chapter 2.Product Overview

About Bluetooth

Bluetooth wireless technology will simplify connections between everyday appliances such as mobile phones, PCs and PDAs. Bluetooth will not be confined to the office - home applications will include portable music players, digital cameras, video recorders and children's toys. In future, Bluetooth technology will be found in the automotive, avionics and industrial controls markets. Bluetooth technology will provide individuals with a personal networking environment that can be found in public places, such as shopping centers, sports stadiums and airports.

The success of the Bluetooth standard will depend on users of the technology enjoying products that are reliable with high-quality connections that can be used "out of the box" to provide immediate connectivity. Industry predicts that hundreds of millions of Bluetooth products will be sold annually by 2003.

The combination of leading-edge RF and protocol technologies, coupled with the requirement to get implementation costs down to a few dollars, puts particularly high demands on the test department to develop test procedures that are comprehensive in terms of both RF and functionality. These tests need to be fast and initiated through a simple user interface. The integration of a module into an OEM product will not necessarily produce predictable results, and the performance of every item will be different, this makes it essential to test to a known set of parameters using an instrument traceable to National Standards.

Anritsu knows the importance of test for RF products. We know that in an OEM production environment, the key requirement will be to validate performance in the shortest time. Production engineers will need to decide on a subset of the Bluetooth RF test specification that is appropriate to their product's requirements.

Working with RF, especially RF at over 2 GHz is not easy, but with Anritsu as your test partner you can be certain of having the most up-to-date and relevant testing capabilities for your Bluetooth products.

The MT8850A

Anritsu have developed the MT8850A, a Bluetooth Test Set to test Bluetooth modules and Bluetooth products - quickly and at low cost.

Anritsu has a century of experience in RF technology, and today has a reputation for developing solutions to test the newest wired and wireless technologies. Our test and measurement products are used by customers in over 100 countries worldwide, and our experience in the measurement business is second-to-none.

MT8850A features

- Fast

  Keep your production lines flowing with the rapid "Quick Test" measurement script. Production test scripts can run in as little as 10 seconds, measuring power, frequency, modulation and receiver sensitivity (BER).

- One touch testing

Once the MT8850A has been configured, each device is tested with a single keystroke. Press RUN to initiate a link, activate Test Mode, perform the measurements and report the results.

- Authoritative

  Tests are made exactly as defined in the Bluetooth RF Test Specification. All measurements are traceable to National Standards so that you can be totally confident in both your production testing and design proving.

- Reference Bluetooth transceiver

  A custom design transceiver offers <I kHz frequency accuracy at the start of any packet and full compliance with the requirements for the "Dirty Transmitter" for true receiver sensitivity measurements. In addition to the standard dirty transmitter table, you can define customized stress conditions with user settable values of Carrier Frequency Offset, Modulation Index, Symbol Timing Error and simulated carrier frequency drift.

- Remote control

  Both GPIB and RS 232 interfaces are offered as standard. Creating test programs has been simplified by the ability to send single commands for initiating a test and returning all results in a single string.

- Small size and weight

  MT8850A takes up minimal space in your test system thanks to its half rack size and low weight. Where Bluetooth interfaces are being introduced into existing products, the disturbance to the test system is minimized.

- Editing tests

  Define your own test scripts to customize the test measurements to your specific requirements. Each test can be enabled or disabled and within any test, parameters such as hopping and can be enabled or disabled, the number of measured packets defined and the specific frequencies of testing set up.

- Single test mode

  A single test can be run continuously so that, for example, the BER of a link can be monitored as additional interfering Bluetooth devices are activated or the distance between the EUT and the MT8850A increased.

- Making a link

  The BT address can be entered manually using the keypad, through the GPIB or RS 232 interface, discovered and selected using Inquiry or read through the EUT HCI interface (RS 232). Once the EUT BT address is known a Bluetooth link is established using Paging. This process typically takes 200 ms.

- Field upgradeable

  The Bluetooth protocol stack is held in FPGA so that future versions of the core Bluetooth specification can be installed locally. The instruments main program is held in flash memory and so product enhancements are also field downloadable.

- Design proving

  Because measurements are made in accordance with the RF Test Specification, MT8850A is the ideal instrument for pre-conformance testing and design proving. Gain

confidence in your product before submitting to a Bluetooth Qualification Test Facility for approval. For the TX output spectrum and spurious emissions tests , MT8850A can establish a BT link and set the EUT to transmit at a fixed frequency the appropriate DH1 packets, just add an Anritsu MS2661C or MS2665C Spectrum Analyzer to your test system.

BlueSuite support software

A complementary BlueSuite software package gives PC control of the MT8850A for advanced design proving measurements on Bluetooth radios. Use BlueSuite to view burst power profiles, modulation eye diagrams, display graphs of the output power of the 79 frequencies and many other advanced diagnostic tools.

Chapter 3.Installation

Introduction

This chapter provides information for the initial inspection and preparation for use of the MT8850A Bluetooth Test Set. Shipping and storage information is also included.

Initial inspection

Inspect the shipping container for damage. If the container or cushioning material is damaged, retain until the contents of the shipment have been checked against the packing list and the instrument has been checked for mechanical and electrical operation.

If the Test Set is damaged mechanically, notify your local sales representative or Anritsu Customer Service Center. If either the shipping container is damaged or the cushioning material shows signs of stress, notify the carrier as well as Anritsu. Retain the shipping materials for the carrier's inspection.

Power requirements

The MT8850A Bluetooth Test Set is operated from AC line power. The MT8850A is intended as an Installation (Overvoltage) Category II, Insulation Category I device.

At power-on, the instrument will perform a brief power-on self test (POST). If a POST error occurs, information and available options will be displayed on the screen. If the POST is successful, the instrument will then go to the top-level script or single test screen that was active when it was powered down.

AC line power

The MT8850A can operate on AC input power of 85-264V, 47-63 Hz, 150 VA maximum. The Test Set automatically configures itself for the voltage applied. An internal fuse protects the AC line input.

DC power

The MT8850A does not have a DC or battery source.

Fuse protection

The MT8850A Bluetooth Test Set is protected on the AC input by an internally mounted fuse. Only qualified service personnel should change this fuse. Replace only with a fuse of the same type and rating, which is 5 mm x 20 mm, 250V, 2.5A T (T= time lag or slo-blo).

Grounding

The MT8850A Bluetooth Test Set must be properly grounded. Failure to ground the instrument could be hazardous to operating personnel. The instrument is supplied with a three-wire power cord.

The instrument is properly grounded when the plug is correctly installed in a grounded receptacle. A grounding terminal is provided on the instrument rear panel.

Environmental requirements

The MT8850A is designed to operate within the temperature range of 5 to 40° C (41 to 104° F) with a maximum humidity of 90% at 40° C (104° F), non-condensing. Full accuracy is specified at 5 to 35° C (23 to 95° F).

Although not recommended, operation in temperatures to –20°C (–4° F) is possible. At these temperatures, however, the liquid crystal display may exhibit excessively slow response.

CAUTION The instrument is cooled by a fan at the rear, which circulates air round the instrument through the vent holes in the base. The fan and the vent holes should not be blocked.

Rack mounting

The MT8850A Bluetooth Test Set can be ordered with rack mounting hardware that allows the instrument to be mounted into a standard 19-inch equipment rack. There are two rack mount option kits available:

The MT8850A-01 Rack Mount option allows the installation of a single MT8850A in either the left or right side rack position.

The MT8850A-03 Rack Mount option allows side-by-side mounting of two MT8850A Test Sets.

MT8850A rack mounting installation

This section describes the assembly procedure for fitting a single MT8850A Bluetooth Test Set into an instrument rack. The MT8850A universal top and bottom covers have removable feet to allow the rack mount kit to be fitted. The procedure involves fitting the support bracket, front plate, base panel, and a rear support bracket to the MT8850A. The MT8850A can then be loaded and secured in the rack position.

Kits Parts List

Anritsu No.	Description	Quantity	Max Torque Setting
50077	Front face plate	1.0	
900-848	M4, kep nut.	2.0	14 lbf.in [158 cNm]
790-319	Speed nut	4.0	
900-345	#4, sst, washer, flat	8.0	
900-821	Decorative screw	4.0	
905-68	M3x8, pos, sst, patchlock, screw, metric, pan head.	8.0	4 lbf.in[158 cNm]
788-575	Snap rivet, plastic	6.0	
C37276	Rack mount, side, bracket	1.0	
C41449	Rear support, bracket, rack mount	1.0	
D41473	Rack mount, support bracket	1.0	

Kits Parts List

49361	Bracket support, base panel	1.0
MT8850A	MT8850A fitted with universal top and bottom covers with removable feet.	1.0

Tools required

1 Small Phillips screw driver

1 Large Phillips screw driver

1 Small Phillips torque screwdriver 10 cNm to 120 cNm.

1 Torque socket driver 6 cNm to 406 cNm.

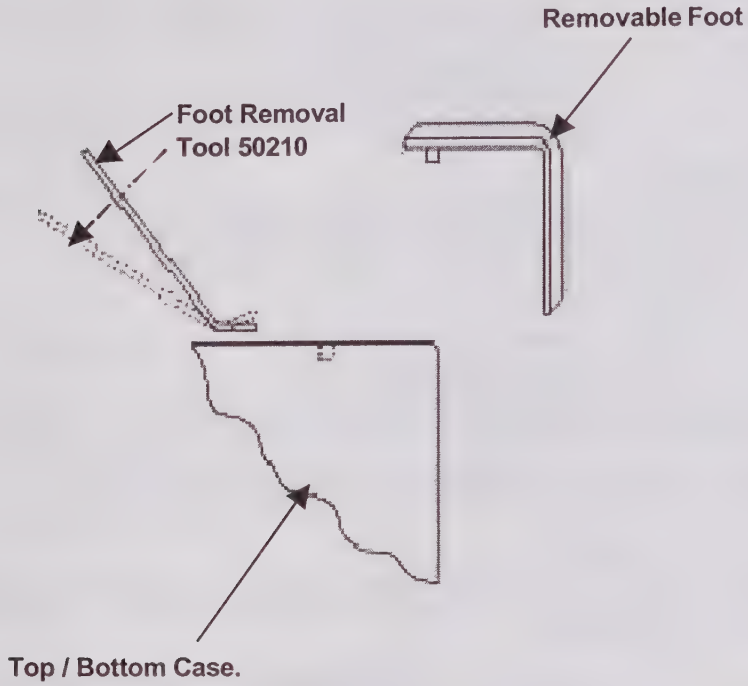
1 Foot removal tool (supplied).

1 Assembly drawing "MT8850A/01 Rack Mounted left or right option"

Assembly procedure

1. Remove all feet from the MT8850A using tool supplied. See diagram and notes on sheet 2 of 3.
2. Confirm the correct tools are available, the parts listed above are present and the assembly drawing is at hand.
3. Lay the large support bracket D41473 next to the MT8850A Bluetooth Test Set as per the assembly drawing. Note if the instrument needs to be mounted on the left side of the rack, simply lay the bracket on the right side. i.e. a mirror image of the assembly drawing.
4. Locate the support bracket on to the four case pillars. Secure with 4 screws 905-68 and 4 washers 900-345. See max. torque setting above. Note leave the two rear screws lose to allow alignment, location, and securing of the 6 base plate snap rivets 788-575.
5. Locate the front rack mounting bracket C37276 at the front of the instrument on the other side to the large support bracket with two screws 905-68 and two washers 900-345. See max. torque setting above.
6. Locate the rear rack bracket C41449 at the back of the instrument on the other side to the large support bracket with two screws 905-68 and two washers 900-345. See max. torque setting above.
7. Fit the front face plate 50077 with 2 kep nuts 900-848. See max. torque setting above.
8. Position the base panel 49361 as shown in the drawing, and secure with 6 snap rivets 788-575.
9. Fit the four speed nut 790-319 to the rack in the correct place to allow mounting of the instrument in the rack.

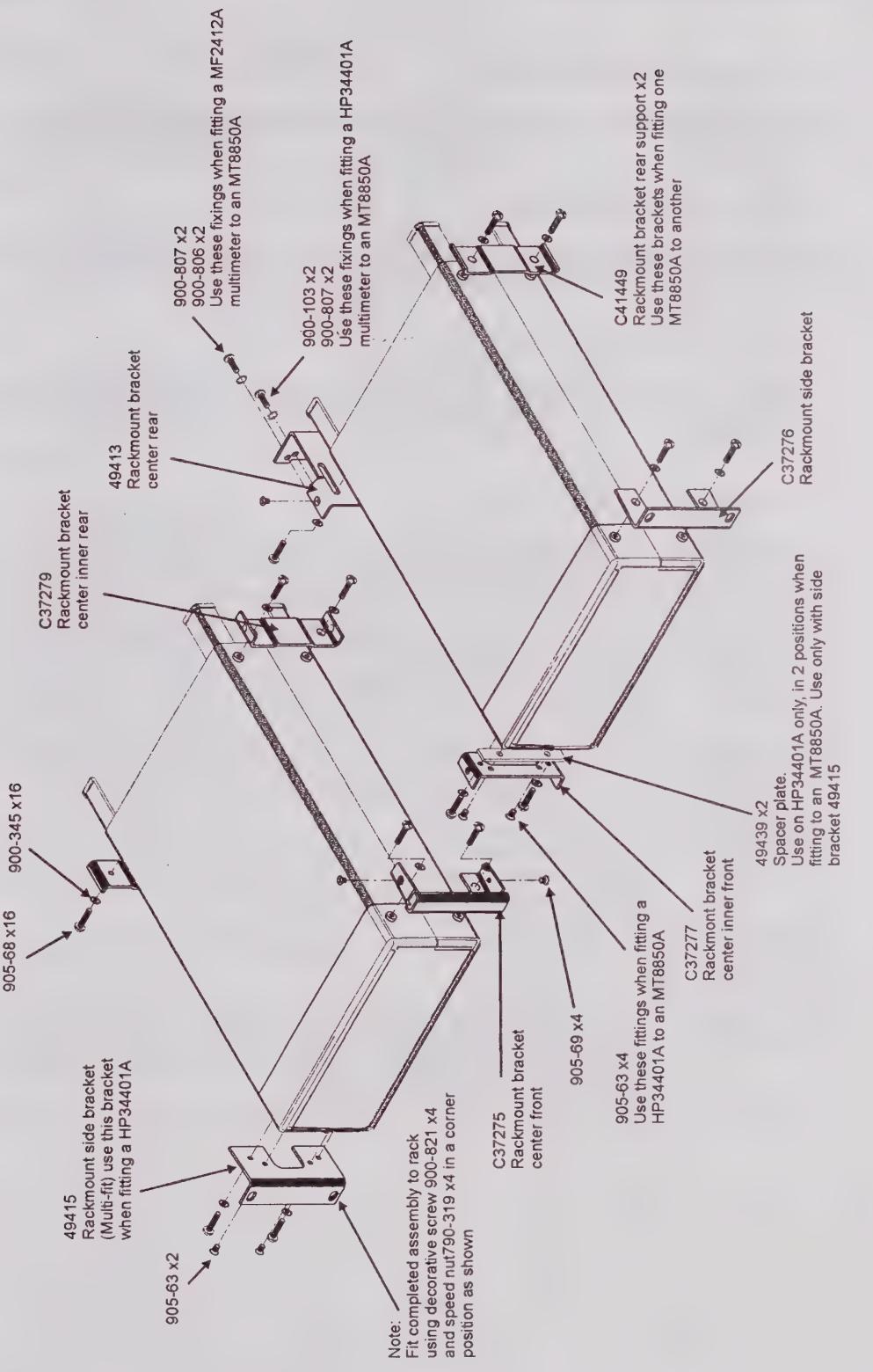
10. Slide the instrument into the rack and secure with 4 decorative screws 900-821.



Foot removal:

1. To remove feet. Locate the removal tool into the recess of each foot located on the top and bottom faces of the covers.
2. Once the removal tool has been located in the foot recess, apply gentle pressure downward. This will release the foot.
3. To replace the feet, simply locate the peg into the recess and press down. The foot will now snap on.

IMPORTANT: When removing the feet, note their placement position. This will ensure that when replacing them they will be correctly fitted.


900-807 x2
900-806 x2
Use these fixings when fitting a MF2412A multimeter to an MT8850A
900-103 x2
900-807 x2
Use these fixings when fitting a HP34401A multimeter to an MT8850A
49413
Rackmount bracket center rear
C37279
Rackmount bracket center inner rear
C41449
Rackmount bracket rear support x2
Use these brackets when fitting one MT8850A to another
C37276
Rackmount side bracket
905-68 x16
900-345 x16
49415
Rackmount side bracket (Multi-fit) use this bracket when fitting a HP34401A
905-63 x2
Note:
Fit completed assembly to rack using decorative screw 900-821 x4 and speed nut790-319 x4 in a corner position as shown
C37275
Rackmount bracket center front
905-69 x4
905-63 x4
Use these fittings when fitting a HP34401A to an MT8850A
C37277
Rackmount bracket center inner front
49439 x2
Spacer plate.
Use on HP34401A only, in 2 positions when fitting to an MT8850A. Use only with side bracket 49415

Storage and shipment

The following paragraphs describe preparing the MT8850A Bluetooth Test Set for storage and shipment.

Preparation for storage

Preparing the MT8850A Bluetooth Test Set for storage consists of cleaning the instrument and packing it with moisture-absorbing desiccant crystals.

Environmental requirements

Store the instrument in a temperature controlled environment that is maintained between -40 and +70° C (-40 to ±156° F), with a maximum humidity of 90% at 40° C (104° F), non-condensing.

Preparation for shipment

To provide maximum protection against damage in transit, the MT8850A Bluetooth Test Set should be repackaged in the original shipping container. If this container is no longer available and the MT8850A is being returned to Anritsu for repair, advise Anritsu Customer Service Center; they will send a new shipping container free of charge. In the event neither of these two options is possible, follow the packaging instructions below.

Use a Suitable Container	Obtain a corrugated cardboard carton with a 125 Kg (275-pound) test strength. This carton should have inside dimensions of no less than 150 mm (6 in) larger than the instrument dimensions to allow for cushioning.
Protect the Instrument	Wrap the instrument to protect the finish.
Cushion the Instrument	Cushion the instrument on all sides by tightly packing dunnage or urethane foam between the carton and the instrument. Provide at least 75 mm (3 in) of dunnage on all sides.
Seal the Container	Seal the carton using either shipping tape or an industrial stapler.
Address the container	If the instrument is being returned to Anritsu for service, mark the address of the appropriate Anritsu service center (see page 3-7), the Return Materials Authorization (RMA) number, and your return address on the carton in a prominent location.

Anritsu service centers

UNITED STATES
ANRITSU SALES COMPANY
685 Jarvis Drive
Morgan Hill, CA 95037-2809
Telephone: (408) 776-8300

Fax: (408) 776-1744

ANRITSU SALES COMPANY
10 Kingsbridge Road
Fairfield, NJ 07004
Telephone: (201) 227-8999

Fax: (201) 575-0092

AUSTRALIA
ANRITSU PTY. LTD.
Unit 3, 170 Foster Road
Mt Waverley, VIC 3149
AUSTRALIA
Telephone: 03—9558-8177

Fax: 03—9558--8255

Brazil
ANRITSU ELETRONICA LTDA.
Praia de Botafogo 440, Sala 2401
CEP 22250-040,
Rio de Janeiro, RJ, Brasil
Phone: 021-527-6922

Fax: 021-537-1456

CANADA
ANRITSU INSTRUMENTS LTD.
215 Stafford Road, Unit 102
Nepean, Ontario K2H 9C1
Telephone: (613) 828-4090

Fax: (613) 828-5400

CHINA
ANRITSU BEIJING SERVICE CENTER
416W Beijing Fortune Building
5 Dong San Huan Bei Lu
Chao Yang Qu, Beijing 1000004, China
Telephone: 011861065909237

Fax: 01186 1065909236

FRANCE
ANRITSU S.A.
9, Avenue du Quebec,
Zone de Courtaboeuf
91951 Les Ullis Cedex, France
Telephone: 016-44-66-546

Fax: 016-44-61-065

GERMANY
ANRITSU GmbH
Grafenberger Alee 54-56, D-40237
Düsseldorf 1, Germany
Telephone: 0211-67-97-60

Fax: 0211-68-33-53

INDIA
MEERA AGENCIES (P) LTD.
Head Office
A-23 Hauz Khas
New Delhi 110 016
Telephone: 011-685-3959

Fax: 011-686-6720

ITALY
ANRITSU Sp.A
Roma Office
Via E. Vittorini, 129
00144 Roma EUR
Telephone: 06-50-22-666

Fax: 06-50-22-4252

JAPAN
ANRITSU CORPORATION
1800 Onna Atsugi-shi
Kanagawa-Prf. 243 Japan
Telephone: 0462-23-1111

Fax: 0462-25-8379

KOREA
ANRITSU CORPORATION LTD.
Room No. 901, Daeo Bldg, 26-5, Yeoido-Dong,
Young Deung Po-Ku, Seoul, Korea
150010
Telephone: 02-782-7156

Fax: 02-782-4590

SINGAPORE
ANRITSU (SINGAPORE) PTE LTD
3 Shenton Way
#24-03 Shenton House
Singapore 068805
Telephone: 226-5206

Fax: 226-5207

HONG KONG
ANRITSU COMPANY LTD.
Suite 812, 8/F, Chinachem Golden Plaza, 77
Mody Road
Tsimshatsui East, Kowloon, Hong Kong, China
Phone:+852-2301-4980

Fax: +852-2301-3545

SOUTH AFRICA
ETESCSA
1st Floor Montrose Place
Waterfall Park
Becker Road
Midrand, South Africa
Telephone: 011-315-1366

Fax: 011-315-2175

SWEDEN
ANRITSU AB
Box 247
S-127 25 Skarholmen
Telephone: 08-74-05-840

Fax: 08-71-09-960

TAIWAN
ANRITSU CO., LTD.
8F, No. 96, Section 3
Chien Kuo N. Road
Taipei, Taiwan, R.O.C.
Telephone: 02-515-6050

Fax: 02-509-5519

UNITED KINGDOM
ANRITSU EUROPE LTD.
200 Capability Green
Luton, Bedfordshire
LU1 3LU, England
Telephone: 015-82-41-88-53

Fax: 015-82-31-303

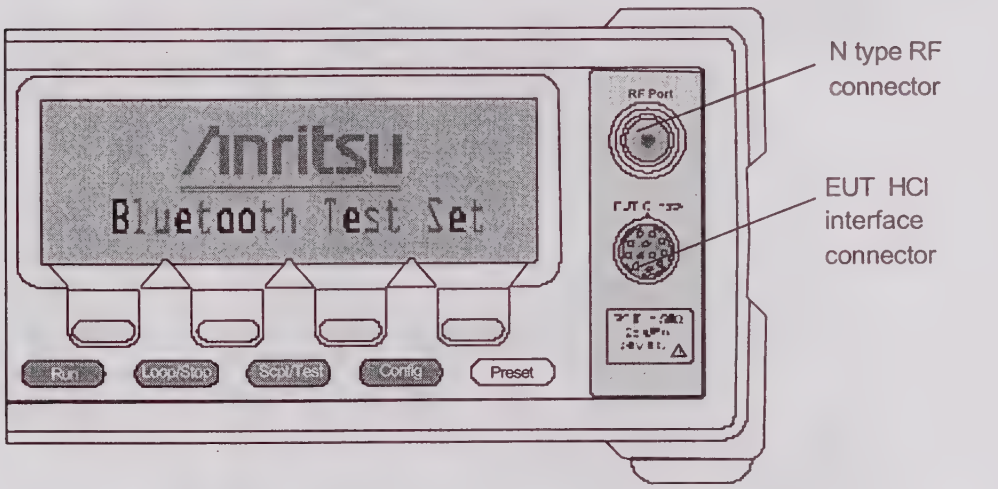
Chapter 4.Connections

Introduction

This chapter describes physical connections to the MT8850A Bluetooth Test Set on both the front and rear panels.

Front panel connectors

The front panel connectors are illustrated below; detailed descriptions of each connector are as follows:



Rear panel connectors

The rear panel connectors are illustrated and described in the diagram on the next page.

IEEE488 Connector
Standard General Purpose Interface Bus Connector used to connect through GPIB to other test equipment and a host computer. The MT8850A is compatible with IEEE-488.1 requirements.
10 MHz REF
For using an external 10MHz reference signal rather than the MT8850A's internal reference standard
INPUT
Test input for service test purposes only.
ID Number Label
The MT8850A Bluetooth Test Set ID number is affixed to the rear panel here. Please use the complete ID number when ordering parts or corresponding with the Anritsu Customer Service department.
OUTPUT 2
Used to check presence and length of transmitted packets
OUTPUT 1
Used to check presence and length of received packets
Chassis Ground
Used as a convenient earth ground reference when line power is applied.
Serial Connector
Serial control and data output commands are entered using the same format as the GPIB interface. Also allows service access for software upgrades which can be downloaded
AC Main Power Input
85-264, 47-63 Hz, 150 VA maximum. The MT8850AVAC Bluetooth Test Set automatically configures itself for the voltage applied. Connecting the AC power here will turn the instrument on. Subsequently, the instrument can be switched between the ON state and the STANDBY state using the front panel ON/Standby button.
10 MHz REF
INPUT
GPIB / IEEE 488
SYSTEM RS232
85-250VAC
47-440 Hz
40VA MAX
OUTPUT 1
OUTPUT 2
CAUTION
DO NOT OPERATE WITH UNGROUNDED POWER CORD
WARNING
NO OPERATOR SERVICE-ABLE PARTS INSIDE.
Anritsu
Made in UK

Chapter 5.Front Panel Operation

Introduction

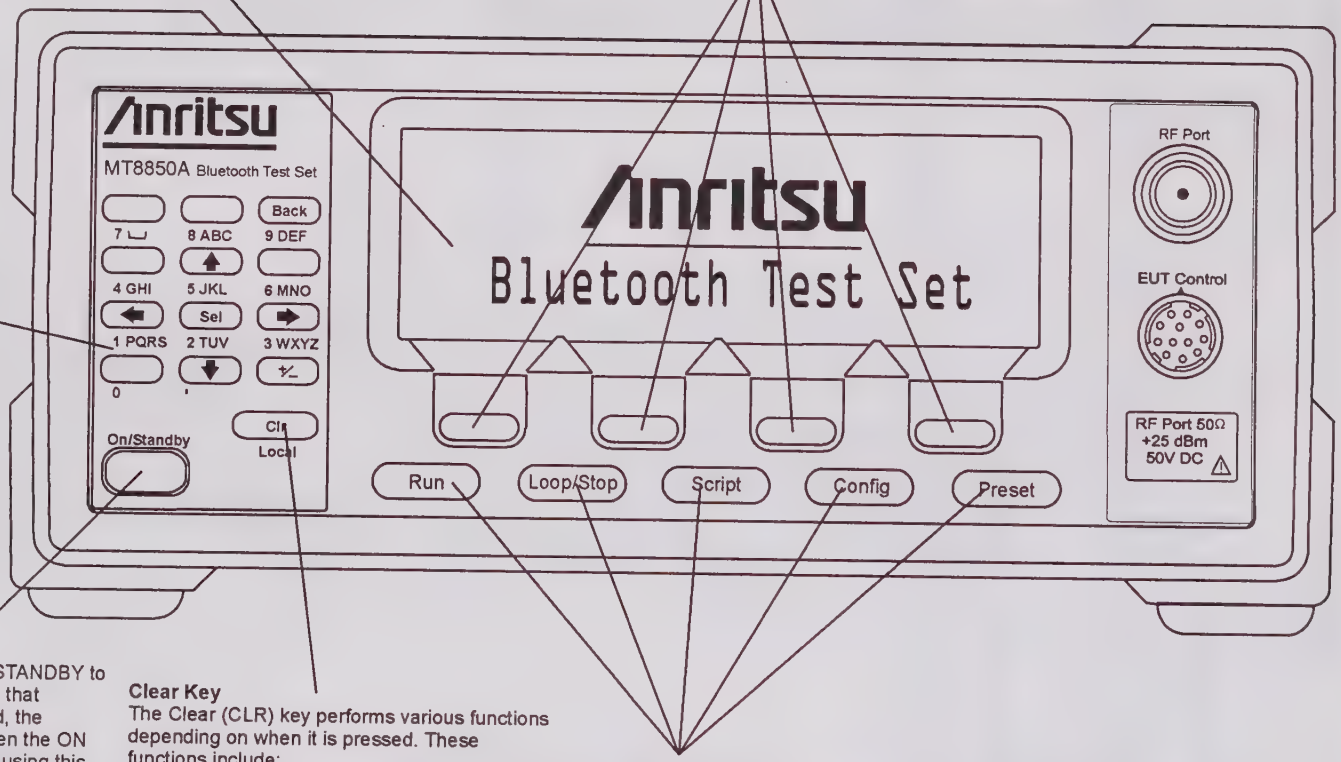
The MT8850A Bluetooth Test Set is controlled from the front panel using the hard and soft keys. This chapter explains the power on procedure and the features and functions of each of the menus.

Front panel controls

The front panel controls are shown and described in the diagram on the next page. The following sections provide more detailed explanations of the Menus and soft keys.

Graphic LCD with Backlight
The LCD display settings are configured in the Config menus. The backlight contrast can be set to suit individual requirements.

Soft Keys
Soft keys select submenus



Alpha/Numeric Keypad
Provides the means for entering Alphabetical or Numeric data in the appropriate menus as required for system configuration.

On/Standby
Switches the MT8850A from STANDBY to ON, or ON to STANDBY. Note that whenever AC power is applied, the power can be switched between the ON state and the STANDBY state using this front panel Power On/Standby key.

Clear Key
The Clear (CLR) key performs various functions depending on when it is pressed. These functions include:
When entering an entry in a menu, clears the digits.
Stops an audible alarm.
Clears the GPIB box from the screen.

Menu Keys
When pressed the first level submenus appear on the display directly above the soft key for that menu function. Refer to the following sections of this chapter for detailed information on using the menu keys.

Power-on-procedure

With the MT8850A Bluetooth Test Set connected to the power supply, press the On/Standby switch.

The MT8850A performs a brief power-on self test (POST). After the POST, the instrument displays the Script menu or the single test screen that was active when it was powered down. If a POST error occurs, information and available options will be displayed on the screen.

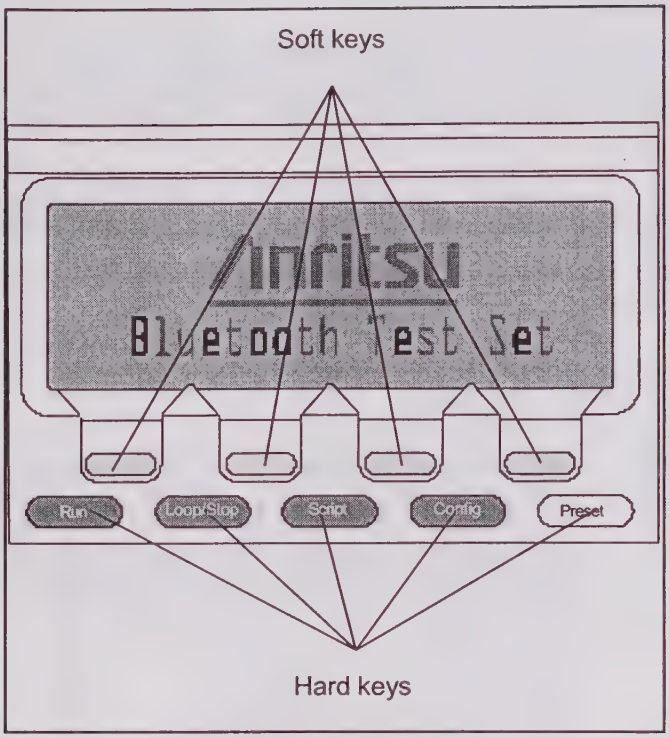
During the power-on self test, only failures and warnings will be displayed on the front panel. If all the tests pass successfully, no self-test information is displayed.

The tests are performed during the power-on self-test, and also when the GPIB *TST? Command is sent.

Conventions

Config	This indicates you need to press the Config hard key. Pressing a hard key provides access to its associated soft-key menu.
[Setup]	This indicates you need to press the Setup soft key. Pressing a soft key provides access to menu options, toggles selections and allows data entry.

Hard and soft keys



Hard and Soft Key locations

Hard keys

Run When this key is pressed the chosen script or test will run once.

Loop/Stop When this key is pressed the chosen script or test will run the number of times defined in the Script setup procedure (see page 7-14). When the key is pressed again while the tests are running, the tests will stop.

Script When the script key is pressed, you can select and edit the various parameters of the script. The script menu would normally be displayed at power up, unless the instrument was in Single test mode when it was switched off.

Config The Config button allows you to configure the MT8850A parameters. The parameters and the procedures are described in the "Configuring the MT8850A" chapter (see page 7-1).

Preset The Preset key presets the instrument to a predefined state. The following parameters are set to default.

Modulation index	0.32
Range hold	Auto
Display contrast	5
Key click	ON
Entry error bleep	ON

	Null packets	OFF
	Script	Set to Qualification script 1
Clr	The Clear key is used when you want to clear the last character entered or when you want to abort from various functions.	
Sel	The Select key is used to select or enter your chosen function.	
Back	The Back key when selected takes you to the previous screen or moves you back one level.	

Soft keys

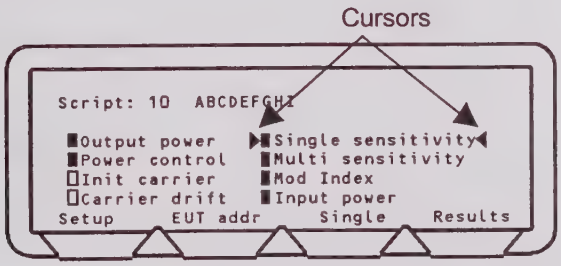
There are four soft key positions on the bottom line of the LCD.

The text corresponding to a soft key appears only when that soft key function is active. These keys perform two distinct functions:

1. To directly access another menu or additional screen. In this case it is used as a navigation key.
2. To initiate an action "Enter", for example.

Choosing screen entries

The four arrow keys on the keypad can be used to move the cursors to the screen entry that you want choose or edit.



For each press the cursors will move in the chosen direction. For vertical movement, when the cursors reaches the top or the bottom, they will start again at the opposite end.

When the cursor is at the item that you want to choose or modify, press the Sel key.

Entering data through the alpha/numeric keypad

The alpha/numeric keypad is used to enter data such as hexadecimal addresses and operates in the following manner. For each consecutive press of a key, the display will show the next character in sequence associated with that key. When you press a different key the last value selected will be entered and the cursor moves to the next position. If you want to enter two or more characters from the same key, you must press the **[Forward]** soft key to enter the value and move on to the next entry position.

For example, to enter the address 000091E082A5, you would need to press the following keys in the sequence shown:

0 [Forward]

0 [Forward]

0 [Forward]

0

9

1

9 9 9

0

8

2

8 8

5

Chapter 6.Getting Started

Before you can run a test the EUT must be initialized so that it is page scanning with text mode enabled.

Preparing the MT8850A for use

1. Connect the RF port on the front panel of the MT8850A to the EUT or to the Bluetooth antenna.
2. If you need to use the HCI interface, connect the EUT control socket to the EUT using the EUT control interface lead supplied.
3. Insure the MT8850A is connected to the mains power supply.
4. Press the On/Standby button on the front panel of the MT8850A.

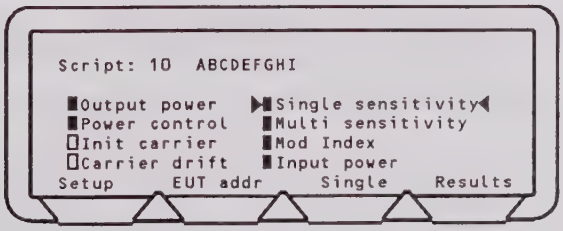
   The MT8850A performs a brief power-on self test (POST). After the POST, the instrument displays the Script menu or the single test screen that was active when it was powered down. If a POST error occurs, information and available options will be displayed on the screen.
5. Press the **Preset** hard key to restore the default settings. These are:

Modulation index	0.32
Range hold	Auto
Display contrast	5
Key click	ON
Entry error bleep	ON
Null packets	OFF
Script	Set to Qualification script 1

Running scripted tests

1. Press the **Script** hard key.

   The Script menu is displayed.



2. Move the cursor to the Script number and press the **Sel** key.
3. Enter the number of the script that you want to run from the keypad or:

Press the **[List]** soft key and move the cursor to the test script that you want to run.

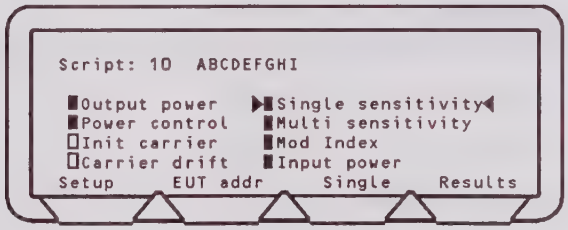
4. Press the **[Enter]** soft key.
5. Press the **[EUT addr]** soft key to enter the BT address of the EUT (see page 8-25).
6. Choose the tests to run by moving the cursor to the individual test and pressing the **Sel** key.
7. Press the **Run** hard key to run the test script once or:

   Press the **Loop/Stop** hard key to run the test script according to the configuration settings of the MT8850A (see page 7-14). Press the **Loop/Stop** hard key again to stop the test.
8. Press the **[Results]** soft key to view the results obtained from the tests. Results are described starting on page 8-27).

Running a single test

1. Press the **Script** hard key.

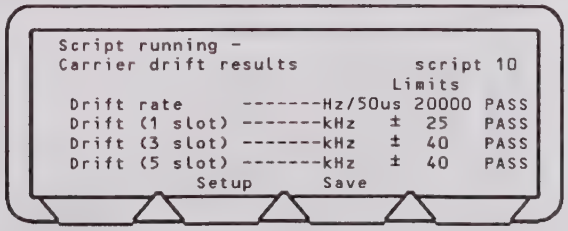
   The Script menu is displayed.



2. Move the cursor to the Script number and press the **Sel** key.
3. Enter the number of the script that you want to run from the keypad or:

   Press the **[List]** soft key and move the cursor to the test script that you want to run.
4. Press the **Sel** key.
5. Press the **[EUT addr]** soft key to enter the BT address of the EUT (see page 8-25).
6. Choose the test that you want to run.
7. Press the **[Single]** soft key.

   The relevant results screen for the test is displayed.



From this screen you are able to set up the test and save this setup information to be used for future tests.

8. Press the **[Setup]** soft key to go the setup screen for the chosen test. See page 8-6 for details of using the setup screens.

   Scripts 1 and 2 are factory defined and cannot be altered.

9. Press the **[Save]** soft key to save the setup information.

10. Press the **Run** hard key to run the test once or:

    Press the **Loop/Stop** hard key to run the test according to the configuration settings of the MT8850A (see page 7-14). Press the **Loop/Stop** hard key again to stop the test.

11. The test results are displayed. Results are described starting on page 8-27).

Running in null packets mode

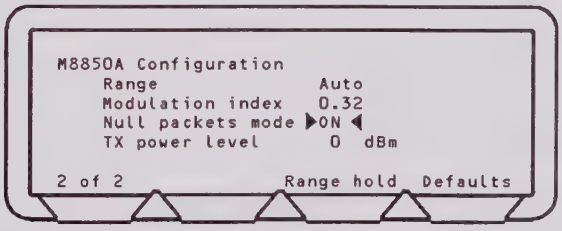
The MT8850A can be made to link to an EUT and maintain the link by sending POLL packets. In response to a POLL packet, the EUT will return a NULL packet. A NULL Packet has no payload but can be used for power and initial frequency measurements without having to activate test mode.

When the menu is entered, only the Output Power and Initial Carrier tests are available.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.

   The MT8850A Configuration screen is displayed.

4. Press the **[1 of 2]** soft key to move to the second screen.



5. Highlight Null packets mode.
6. Press the **Sel** key to change from the displayed condition.
7. Run the scripted test (see page 6-1) or single test (see page 6-2).

Chapter 7.Configuring the MT8850A

Introduction

The MT8850A is configured from menu entries accessed by pressing the Config hard key. The menu entries are used to configure the equipment under test (EUT), the MT8850A and the way in which the test scripts are run. This chapter describes the procedures for configuring the MT8850A. Each of the settings for each of the level 3 items is described in one instruction.

The following table shows a map of the menu structure beneath the Config hard key and the page number where the setup procedure can be found.

Level 2	Level 3	Settings
Equipment under test (EUT)	View user friendly name (see page 7-3)	EUT address EUT user friendly name
	View supported features (see page 7-4)	EUT supported features
	EUT control setup (see page 7-4)	Baud rate Parity Data length Stop bits
	Inquiry setup (see page 7-5)	Inquiry parameter Common name
MT8850A	Identity (see page 7-7)	BT address User friendly name Serial number Version Core boot Core code Control FPGA RF FPGA DSP
	System interface (see page 7-7)	GPIB address RS 232 baud rate RS 232 mode RS 232 parity RS232 data length RS 232 stop
	Display/sound (see page 7-8)	Display contrast Key click Entry error bleep User text display Enter user text GPIB indicators

Level 2	Level 3	Settings
MT8850A (continued)	Channel pattern (see page 7-9)	Standard Reduced
	Signal generator (see page 7-10)	Pattern RF power Channel number Modulation index Power level
	Range hold (see page 7-11)	
	Modulation index (see page 7-12)	
	Null packets mode (see page 7-12)	
	TX power level (see page 7-13)	
Scripts setup (see page 7-14)	Loop stop on failure Loop continuously Loop count Display frequency as	
System features	Connection control (see page 7-14)	ACL connection only ACL connection and features Make me an EUT Inquiry Scan Disconnect from EUT
	Internal comms log (see page 7-15)	
	EUT comms log (see page 7-16)	
	Software update (see page 7-16)	
Service	This selection is provided for use by qualified service personnel and is password protected. There are no service procedures described in this manual.	

Setting up the EUT

Viewing the EUT address and user friendly name

Each piece of Bluetooth equipment has a unique identifier called a BT address. This is in the form of a 12 character hexadecimal address. Equipment can also be given a meaningful name. This selection lets you view the address and user friendly name of the equipment under test.

1. Press the **Config** hard key.
2. Choose Equipment Under Test (EUT).
3. Press the **Sel** key.
4. Choose View user friendly name.
5. Press the **Sel** key.

   If the MT8850A is already in a link with the EUT, this screen will immediately display the EUT address and User friendly name. If it is not in a link, press the **[Refresh]** soft key to make a link and read this data.

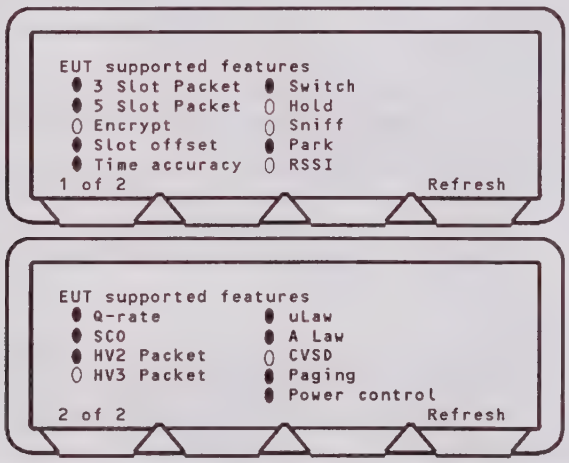
   The user friendly name can be up to 248 characters but will be truncated to 177 characters on the screen.
6. Press the **[Refresh]** soft key to reread the information from the EUT.
7. Press the **Back** key to exit this screen.

Viewing supported features

Bluetooth equipment can support a number of optional features defined in the Bluetooth specification.

1. Press the **Config** hard key.
2. Choose Equipment Under Test (EUT).
3. Press the **Sel** key.
4. Choose View supported features .
5. Press the **Sel** key.

   If the MT8850A is already in a link with the EUT, this screen will immediately display the EUT supported features screens. If it is not in a link, press the **[Refresh]** soft key to make a link and read this data.



   A filled-in ellipse indicates supported features . Unsupported features show an empty ellipse. In screen 2 of 2, for example, Encryption is not supported and Power control is supported for the equipment under test.

6. Press the **[1 of 2]** soft key to move to the second screen or the **[2 of 2]** soft key to move back to the first screen.
7. Press the **[Refresh]** soft key to reread the information.
8. Press the **Back** key to exit this screen.

Setting up the EUT control

The control setup enables you to configure the serial communications that are used to link the HCI of the equipment under test to the MT8850A tester.

1. Press the **Config** hard key.
2. Choose Equipment Under Test (EUT).
3. Press the **Sel** key.
4. Choose EUT control setup.
5. Press the **Sel** key.

   The EUT RS232 setup screen is displayed.

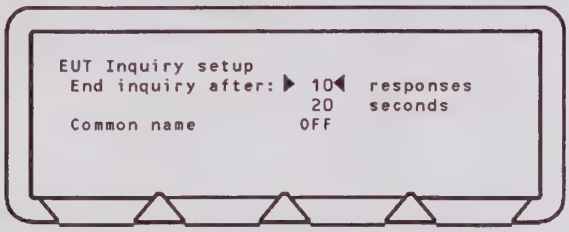
   - The RS232 baud rate can be 1200, 2400, 4800, 9600, 19200, 38400 or 57600 baud but must be the same at both ends.
   - Parity can be 0, 1 or None.
   - Data length can be 7 or 8 bits
   - Stop can be 1 or 2 bits.
6. Select the item that you want to change.
7. Repeatedly press the **Sel** key until the required value is displayed.
8. Press the **Back** key to exit this screen.

Setting up Inquiries

The Inquiry feature is provided to read the address directly from the EUT through the radio interface. This procedure sets up the conditions for making an Inquiry.

1. Press the **Config** hard key.
2. Choose Equipment Under Test (EUT).
3. Press the **Sel** key.
4. Choose Inquiry setup.
5. Press the **Sel** key.

   The EUT Inquiry setup screen is displayed.

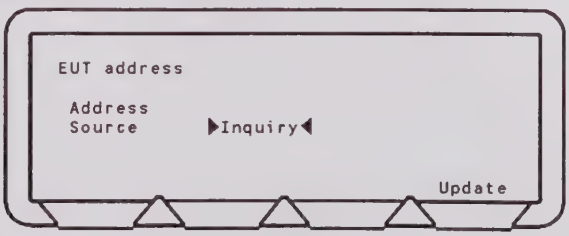


   You can set the Inquiry to end after the displayed number of responses (0 to 255) or within the specified number of seconds (5 to 60). You can also determine whether to show the first part of the user friendly name (Common name).
6. For each of the End Inquiry after entries, responses and seconds, choose the item.
7. Enter the value using the keypad.
8. Choose Common name.
9. Press the **Sel** key to change the status.
10. Press the **Back** key to exit this screen.

To make an Inquiry:

1. Press the **Script** hard key.
2. Press the **[EUT addr]** soft key.

   The EUT address screen is displayed.



3. Choose the Source.
4. Press the **Sel** key to switch repeatedly until Inquiry is displayed.

5. Press the **[Update]** soft key to initiate the Inquiry.
6. Press the **Back** key to exit this screen.

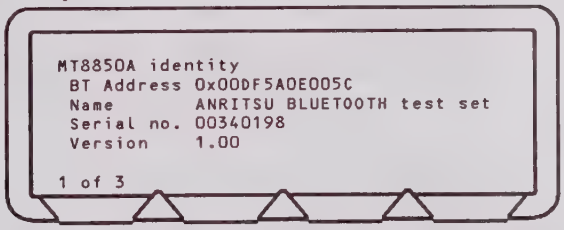
Setting up the MT8850A

This section provides the procedures for setting up the MT8850A in order to run the tests.

Displaying the identity of the MT8850A

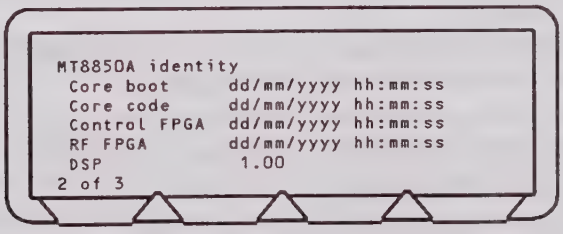
1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.
4. Choose Identity.
5. Press the **Sel** key.

   The MT8850A identity screens are displayed.



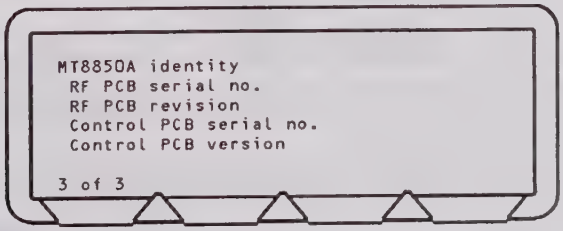
   Screen 1 shows the Bluetooth address, user friendly name, serial number and software version number.

6. Press the **[1 of 3]** soft key to move to the second.



   Screen 2 shows the different software modules and the date and time of creation.

7. Press the **[2 of 3]** soft key to move to the third.



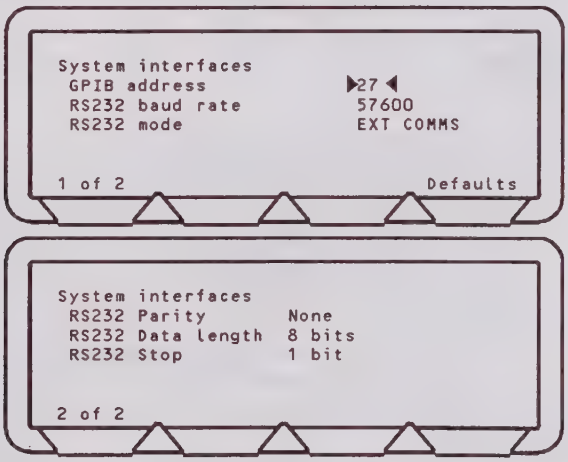
8. Press the **Back** key to exit this screen.

Configuring the system interfaces

The MT8850A can be controlled remotely from a PC through the GPIB or the RS232 serial connecting ports on the rear of the instrument. This menu configures the settings of these two interfaces.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.
4. Choose System interfaces.
5. Press the **Sel** key.

   The System Interfaces screens are displayed.



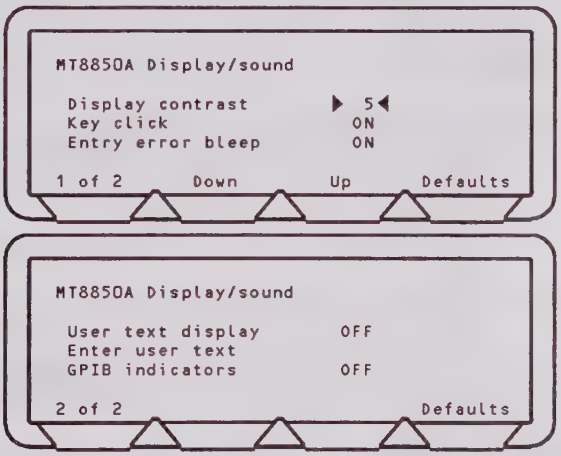
   - The GPIB address is the address by which the remote computer will recognise the MT8850A.
   - The RS232 baud rate can be 1200, 2400, 4800, 9600, 19200, 38400 or 57600 baud but must be the same at both ends.
   - The RS232 mode can be EXT HCI when using an external PC for system debugging or EXT COMMS during normal operation.
   - The RS232 Parity can be 0, 1 or None.
   - The RS232 Data length can be 7 or 8 bits
   - The RS232 Stop can be 1 or 2 bits.
6. Select the item that you want to change.
7. Repeatedly press the **Sel** key until the required value is displayed.
8. Press the **[1 of 2]** soft key to move to the second screen or the **[2 of 2]** soft key to move back to the first screen.
9. Press the **[Defaults]** soft key to restore the factory set default values for the system interfaces .
10. Press the **Back** key to exit this screen.

Setting the screen display and sound

You can determine how the user interface will operate.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.
4. Choose Display/sound.
5. Press the **Sel** key.

   The MT8850A Display/sound screens are displayed.



   - The display contrast reduces or increases the lighting to the display in the range of 1 (dark) to 10 (light). The value is changed using the appropriate **[Contrast]** soft key.
   - Key click, when set to ON, will cause the instrument to click each time a key is pressed.
   - Entry error bleep, when set to ON will cause the instrument bleep when you enter the wrong information through the keypad.
   - User text display, when set to ON, will enable user text of up to 15 characters to be displayed on the top line of the screen. When set to ON, you can select Enter user text and enter the required text using the keypad.
   - When GPIB indicators is set to ON, GPIB status messages will be displayed on the bottom line of the MT8850A

6. Select the item that you want to change.
7. For the ON/OFF values, press the **Sel** key to toggle the value.
8. Press the **[1 of 2]** soft key to move to the second screen or the **[2 of 2]** soft key to move back to the first screen.
9. Press the **[Defaults]** soft key to restore the factory set default values for the system interfaces.
10. Press the **Back** key to exit this screen.

Defining the channel pattern

The channel pattern determines whether the tests will use the standard channel pattern as defined in the Bluetooth specification or a reduced pattern. The reduced pattern is provided to support a quick testing of the radio over the complete frequency range. Reduced hopping uses only five frequencies on which sequential hopping is done.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.
4. Choose Channel pattern.
5. Press the **Sel** key.

   The MT8850A Channel pattern screen is displayed.

   A filled box will identify the selected value. The unselected value will show a hollow box. Standard is selected in the illustration.

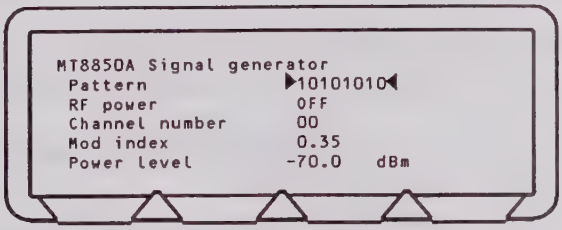
6. Select Standard or Reduced as required. Standard is the default value. A warning symbol will be displayed in the top line if Reduced is chosen.
7. Press the **Sel** key to set the pattern required.
8. Press the **Back** key to exit this screen.

Setting up the signal generator

The signal generator allows you to define and generate a continuously modulated Bluetooth signal. When you access the screen, the signal generator is switched ON and switched OFF when you exit the screen. The signal generator parameters can be changed when required.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.
4. Choose Signal generator.
5. Press the **Sel** key.

   The MT8850A Signal generator screen is displayed.



- You can switch the modulating bit pattern between 10101010, 11110000 and CW where is CW is an unmodulated carrier wave.
- RF power can be switched ON or OFF.
- Channel number can be in the range -2 to 80. This can also be entered as a frequency depending on how the test script operation has been set up. See page 7-14 to change the settings between channel number and frequency displays.
- Modulation index can be in the range 0.2 to 0.4.
- Power level range from -80 to 0 dBm.

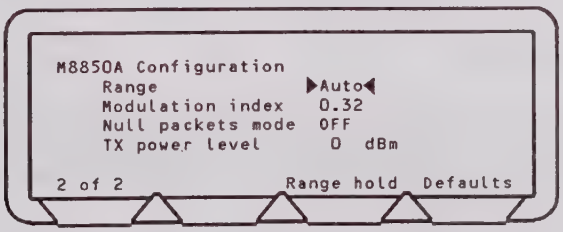
6. Select the item that you want to change.
7. Repeatedly press the **Sel** key until the required value is displayed or enter a value using the keypad as appropriate.

Setting the range hold

The Range Hold facility allows you fix the MT8850A measuring receiver on a given range and disable the auto-range feature.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.

   The MT8850A Configuration screen is displayed.
4. Press the **[1 of 2]** soft key to move to the second screen.



5. Highlight the Range hold value.

   The values are Auto, 1 2, 3, 4, 5 and 6.
   - Auto is the default setting.
   - RGH1 represents a range of +22 to +7 dBm.
   - RGH 2 represents a range of +9 to -3 dBm.
   - RGH 3 represents a range of +5 to -7 dBm.
   - RGH 4 represents a range of -4 to -16 dBm.
   - RGH 5 represents a range of -12 to -26 dBm.

- RGH 6 represents a range of -24 to -35 dBm.

When any of the numbered ranges is displayed, the value will be displayed on the top line of the screen.

When the value is Auto, the **[Range hold]** soft key is displayed and will cause the current range to be held when pressed.

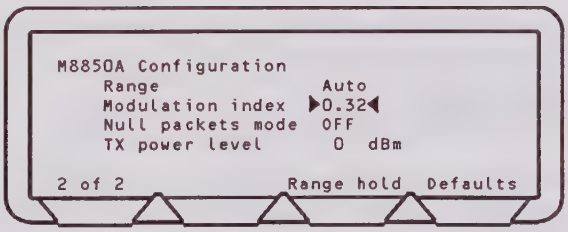
6. Repeatedly press the **Sel** key until the required value is displayed.

Setting the modulation index

The modulation index is the Deviation/Modulation rate. For normal Bluetooth operation this should be set to 0.32. To test an EUT under other conditions, the modulation index can be set to other values.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.

   The MT8850A Configuration screen is displayed.
4. Press the **[1 of 2]** soft key to move to the second screen.



5. Highlight the Modulation index value.

   The modulation index can be in the range 0.20 to 0.40. The default value is 0.32.
6. Enter the value using the keypad.

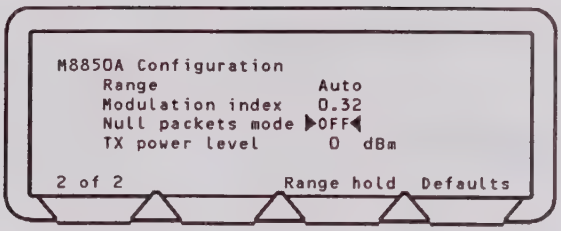
Null packets mode

The MT8850A can be made to link to an EUT and maintain the link by sending POLL packets. In response to a POLL packet, the EUT will return a NULL packet. A NULL Packet has no payload but can be used for power and initial frequency measurements without having to activate test mode.

When the menu is entered, only the Output Power and Init Carrier tests are applicable.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.

   The MT8850A Configuration screen is displayed.
4. Press the **[1 of 2]** soft key to move to the second screen.



5. Highlight Null packets mode.
6. Press the **Sel** key to change from the displayed condition.

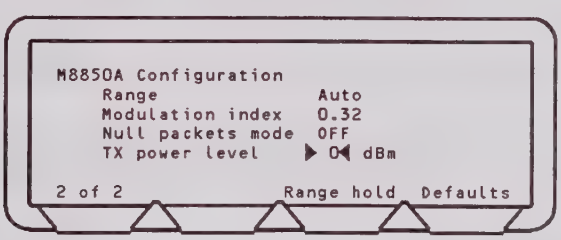
TX power level

This sets RF power of the MT8850A transmitter. This power level is used for link setup and all measurement with the exception of EUT receiver sensitivity and maximum output power.

You can set the transmission power level to between 0 and -80 dBm.

1. Press the **Config** hard key.
2. Choose MT8850A.
3. Press the **Sel** key.

   The MT8850A Configuration screen is displayed.
4. Press the **[1 of 2]** soft key to move to the second screen.



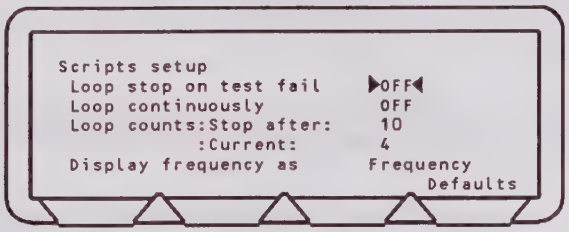
5. Highlight TX power level.
6. Enter the value using the keypad.

Setting up test script operation

You can determine how test scripts are run.

1. Press the **Config** hard key.
2. Choose Scripts setup.
3. Press the **Sel** key.

   The Scripts setup screen is displayed.



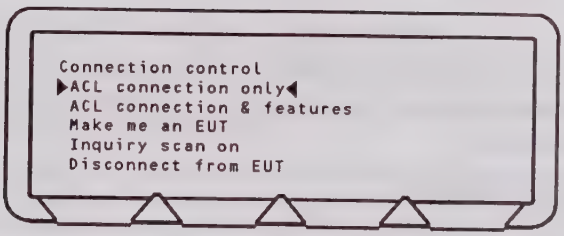
   - Loop stop on failure, when ON, will run the test repeatedly until a failure is recorded or the test is stopped.
   - Loop continuously, when ON, will run the test until it is stopped.
   - Loop count will run the test for the number of loops defined. When Loop stop on failure or Loop continuously is set to ON, this will display N/A they take precedent.
   - Display frequency will determine whether a channel is displayed in number format (0 to 78) or by actual frequency in MHz.
   - Current will display the number of completed loops when the instrument is in loop mode.
4. Select the item that you want to change.
5. For Loop stop on failure, Loop continuously and Display frequency, press the **Sel** key to switch the values. For Loop count, enter the value using the keypad.

System features

Setting the link

1. Press the **Config** hard key.
2. Choose System features.
3. Press the **Sel** key.
4. Choose Connection control.
5. Press the **Sel** key.

   The connection control screen is displayed.



From this screen you can determine how the asynchronous link (ACL) will operate. The choices are:

- ACL connection only
- ACL connection and features
- Make me an EUT - You can make the MT8850A behave as equipment under test. This means that it is page scanning with test mode enabled.
- Inquiry scan on - The Inquiry feature allows the instrument to respond to an inquiry from another device. It is especially useful for synchronizing with some Bluetooth protocol analyzers. The protocol analyzer can then monitor the messages between the MT8850A and the EUT.
- Disconnect from EUT

6. Choose the operation that you require.
7. Press the **Sel** key.

Turn the instrument OFF then ON to exit from this situation.

Viewing an internal communications log

This selection will cause the screen to display a log of transmitted and received packets.

1. Press the **Config** hard key.
2. Choose System features.
3. Press the **Sel** key.
4. Press the **[1 of 2]** soft key.
5. Choose Internal comms log.
6. Press the **Sel** key.
7. Use the arrow keys to scroll through the log.

Viewing an EUT communications log

This selection will cause the screen to display a log of HCI communications between the EUT and the MT8850A.

1. Press the **Config** hard key.
2. Choose System features.
3. Press the **Sel** key.
4. Press the **[1 of 2]** soft key.
5. Choose EUT comms log.
6. Press the **Sel** key.
7. Use the arrow keys to scroll through the log.

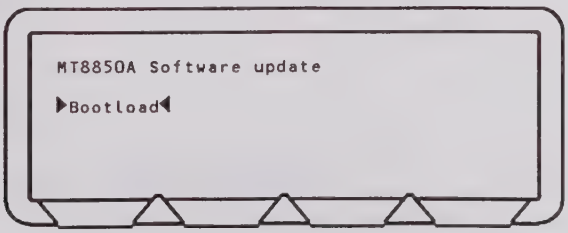
Updating the software

CAUTION Do not use this procedure unless you have updated software and intend to update it at this time. Once you have chosen Bootload and pressed the **Sel** key, the instrument will expect a firmware download. To recover from this status, if the firmware upgrade is not performed, it is necessary to disconnect the instrument from the mains power supply by removing the power cord from the rear panel of the instrument.

Software updates can be downloaded from a PC connected to the MT8850A through the GPIB or RS232 connector. This can only occur when Bootload is selected.

1. Press the **Config** hard key.
2. Choose System features.
3. Press the **Sel** key.
4. Press the **[1 of 2]** soft key.
5. Choose Software update.
6. Press the **Sel** key.
7. Enter your password using the keypad.

   The MT8850A Software update screen is displayed.



8. Choose Bootload

9. Download the software upgrade from the connected PC.

   The download procedure requires that you copy some files from the upgrade disk and run a batch program to implement the changes. This is described in the Readme document supplied on the upgrade disk.

CAUTION Do not stop the upgrade once started, as you will not be able to restore the instrument to operation. If this should occur because of a PC breakdown, contact your Anritsu Service Center for advice. See page 3-7 to find your Anritsu Service Center.

Service

This selection is provided for use by qualified service personnel and is password protected. There are no service procedures described in this manual.

Chapter 8.Using the Script Menu

Introduction

The sequence of tests that is run is determined by one of 10 possible scripts, which define the tests to be run.

Scripts 1 and 2 are pre-configured and the tests cannot be altered. Scripts 3 to 10 are unlocked by default but can be locked and password protected (see page for 8-3 details). If you attempt to change parameters for a locked script, a warning message is displayed.

The scripted tests are set up and run from menu entries accessed by pressing the **Script** hard key. You can use entries in this menu to view the address and user friendly name for the EUT and display results of tests.

There are eight tests defined and the procedures for configuring the test, running the test and obtaining the results are described for each test.

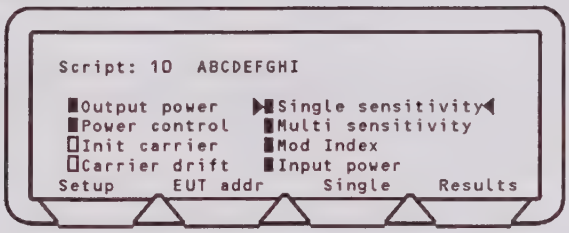
The script menu provides access to configuring, running single tests and obtaining the results for each test as well as checking the address of the EUT.

Accessing the script menu

To access the script menu:

1. Press the **Script** hard key.

   The Script menu is displayed.



   The menu shows all of the possible tests. A filled-in box indicates those tests that are available. A hollow box indicates unavailable tests. In the illustration above, Initial the Carrier and Carrier Drift tests are unavailable.

   From this menu you can:

   - Lock, unlock and edit the scrip name. You can also change your password from within this selection. See page 8-3.
   - Choose and run the selected script. See page 8-5.
   - Set up individual tests and set the limits of that test. See:

     Output power test - page 8-8

     Power control test - page 8-5

     Initial carrier test - page 8-11

     Carrier drift test - page 8-13

     Single slot sensitivity test - page 8-15

     Multi-slot sensitivity test - page 8-17

     Modulation index test - page 8-19

     Maximum input power test - page 8-22
   - Check the address of the equipment under test (see page 8-25).
   - Run a single test - (see page 8-26).
   - Display the results of a test. See:

     Output power test - page 8-8

     Power control test - page 8-5

     Initial carrier test - page 8-11

     Carrier drift test - page 8-13

     Single slot sensitivity test - page 8-15

     Multi-slot sensitivity test - page 8-17

     Modulation index test - page 8-19

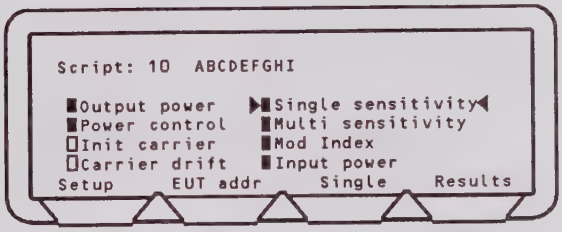
     Maximum input power test - page 8-22

Locking and unlocking a script

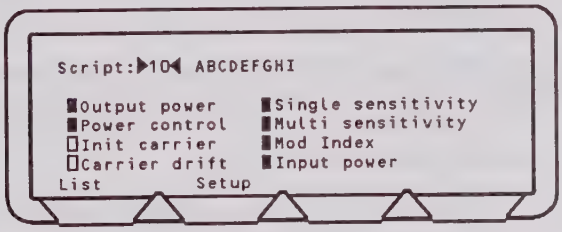
You can access any of the 10 scripts in order to edit the script name, lock/unlock a script (scripts 3 to 10 only) and set or change the access password.

1. Press the **Script** hard key.

   The Script menu is displayed.



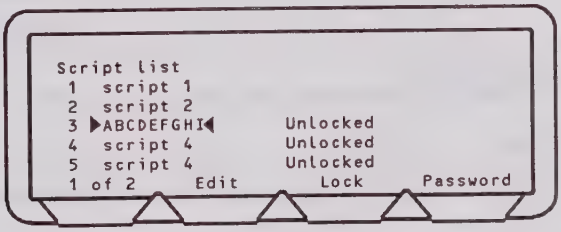
2. Move the cursor to the Script number.

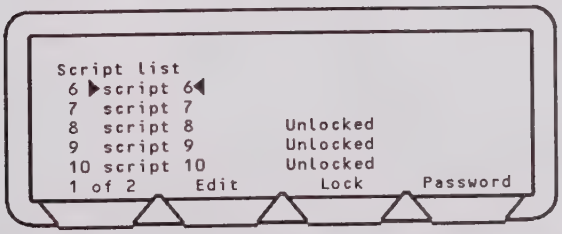


   The soft keys change to **[List]** and **[Setup]**. **[List]** will display a list of scripts and **[Setup]** will take you to the Path Loss table for script named (see page 8-6).

3. Press the **[List]** soft key.

   The Script list screens are displayed.





4. ***To change the name of a script:*** Choose the script, press the **[Edit]** soft key and enter a name from the keypad. Press the **[Enter]** soft key.

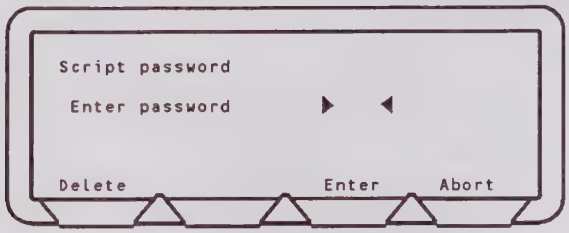
   The Edit key is only available if the script is unlocked.

5. ***To lock/unlock the script:*** Choose the script, press the **[Lock]** or **[Unlock]** soft key.

> You may need to enter a password. If you have not changed the password, the factory default is 1234.

6. ***To set or change the password:*** Choose the script, press the **[Password]** soft key.

   The Script password screen is displayed.



7. Enter the password using the keypad.
8. Press the **[Enter]** soft key.
9. Press the **[Delete]** soft key to delete the character at the cursor and move the cursor one place to the left.

   Once a password has been entered successfully, The **[Password]** soft key will change to **[Edit Passwd]**. This screen will be displayed after pressing the **[Edit Passwd]** soft key.

   The Script password edit screen is displayed.

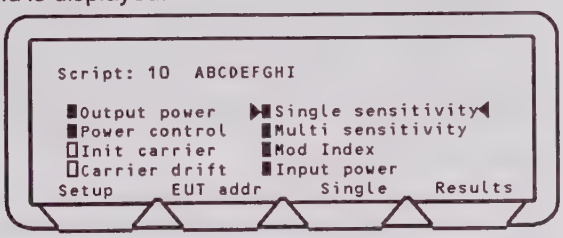
10. Enter the old four-digit password. The factory set password is 1234.
11. Enter the new four-digit password if you are changing.
12. Confirm the new password.
13. Press the **[Enter]** soft key to save the password or the **[Abort]** soft key to retain the previous setting.

Running the tests

The script menu provides access to configuring, running individual tests and obtaining the results for each test as well as checking the address of the EUT.

1. Press the **Script** hard key.

   The Script menu is displayed.



2. Move the cursor to the Script number and press the **Sel** key.
3. Enter the number of the script that you want to run from the keypad or:

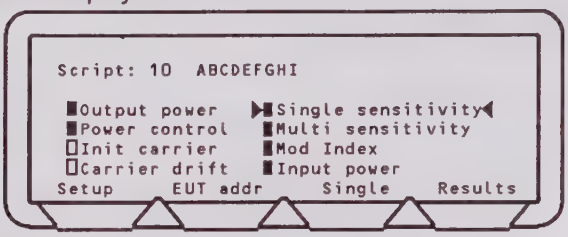
   Press the **[List]** soft key and move the cursor to the test script that you want to run.
4. Press the **[Enter]** soft key.
5. Press the **[EUT addr]** soft key to enter the BT address of the EUT (see page 8-25).
6. Choose the tests to run by moving the cursor to the individual test and pressing the **Sel** key.
7. Press the **Run** hard key to run the test script once or:

   Press the **Loop/Stop** hard key to run the test script according to the configuration settings of the MT8850A (see page 7-14). Press the **Loop/Stop** hard key again to stop the test.
8. Press the **[Results]** soft key to view the results obtained from the tests. Results are described starting on page 8-27).

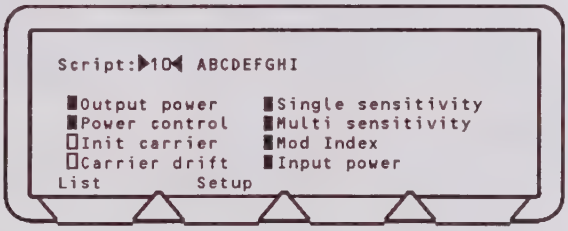
Setting up general script parameters

1. Press the **Script** hard key.

   The Script menu is displayed.

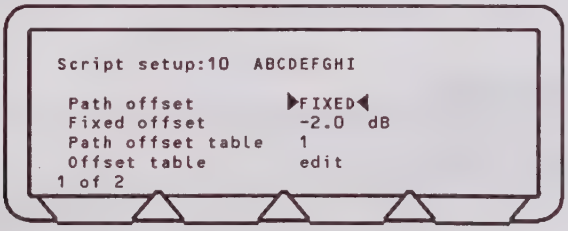


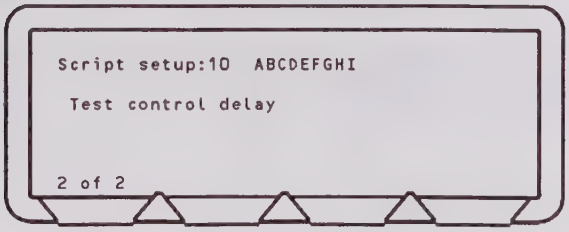
2. Move the cursor to the Script number.



3. Press the **[Setup]** soft key.

   The Script setup screens are displayed.





   You can set the path offset to OFF, FIXED or TABLE.

   When the path offset is OFF you are unable to carry out any activity with the fixed offset and path offset tables and these values are set to N/A.

   When the path offset is fixed, you can enter the fixed offset value.

   When the path offset is table, you can choose any of the 5 offset tables for which you want to edit the values in the offset table.

   When the MT8850A sends a Test Control command (Loopback, TX or Test Pause) the EUT may require a period of time to respond before it has actioned the Test Control. This time will vary between differing Bluetooth developers implementations. Test control delay causes the MT8850A to pause from measuring returned packets until the

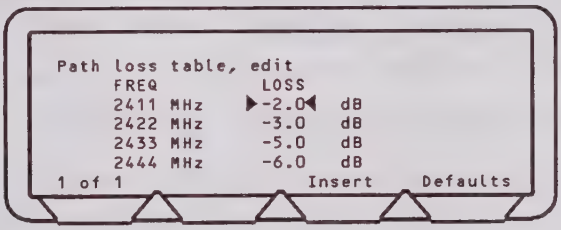
EUT has had time to respond. The number entered is the number of transmitted packets from the MT8850A that are ignored before measurements are started. The Test Control delay value can be between 0 and 255.

Choose Path offset and press the **Sel** key to switch between OFF, FIXED and TABLE.

For FIXED: Choose Fixed offset, enter the offset value from the keypad and press the **Sel** key.

For TABLE: Choose Offset table edit and press the **Sel** key.

The Path loss table edit screen is displayed.



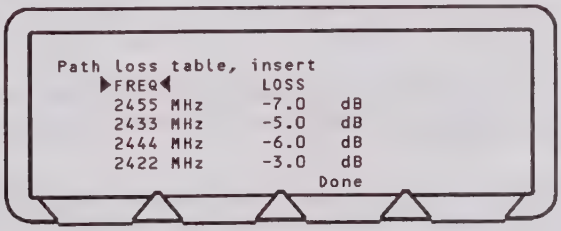
This table is blank on the first entry. Press the **[Insert]** soft key to complete the table. You can edit an existing entry or enter new items to the top of the list each consisting of frequency and loss values . When you exit the screen the list is sorted in order of frequency.

The **[Default]** soft key, when displayed, deletes all entries.

4. **To edit an entry in the table:** Choose the LOSS entry that you want to edit, press the **Sel** key and enter the required information.

   If you want to delete an entry, choose the FREQ entry and press the **Clr** key.

5. ***To enter a new line in the table:*** Press the **[Insert]** soft key.



Choose FREQ and press the **Sel** key. Enter the new table information from the keypad.

Press the **[Done]** soft key to enter and sort the new information and return to the previous screen.

Setting up individual tests

Individual tests can be tailored to suit requirements. The setup procedures and limits are described on the following pages:

Output power test - page 8-8
Power control test - page 8-5
Initial carrier test - page 8-11
Carrier drift test - page 8-13
Single slot sensitivity test - page 8-15
Multi-slot sensitivity test - page 8-17
Modulation index test - page 8-19
Maximum input power test - page 8-22

Setting up the output power test

The output power test performs power measurements on the EUT transmitted packets in one of three ways. The link is frequency hopping in each case.

With Hopping On mode set to "Defined" the MT8850A measures power only when the link hops to one of the frequencies defined on the LOW, MEDIUM and HIGH set up screen. Although the measurements are only made at the defined frequencies, it is still a hopping link. The number of packets measured at each frequency is set by the user in the "Number of packets" field. This is the test method described in the Bluetooth RF Test Specification.

With Hopping On mode set to "All" the MT8850A measures the power at every one of the 79 frequencies in the Bluetooth channel structure. The number of packets measured at each frequency is set by the user in the "Number of packets" field.

With Hopping On mode set to "Any" the MT8850A measures the power at the next frequency that the link hops to after the previous power measurement has been completed. The total number of packets measured is set by the user in the "Number of packets" field. This is typically the shortest of the three options as there is no requirement to measure a large number of packets at specified frequencies.

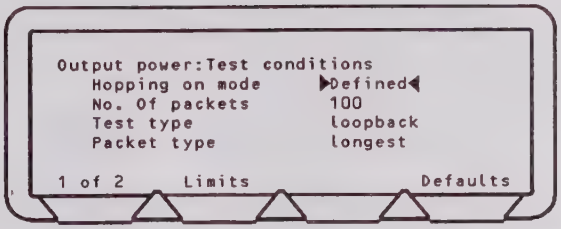
The MT8850A can perform the test using either loopback test controls or TX test controls. The default form for this test is to use loopback. The following test description is described using the default test control.

The MT8850A transmits a pseudo random data payload (PRBS 9) of the longest supported type (DH5, DH3 or DH1) or the selected packet type, to the EUT. The EUT loops back the data at its maximum output power and the MT8850A measures the received power. This test is performed while hopping, and the test is repeated until the requested number of packets has been measured on each of the selected frequencies. The LOW, MEDIUM and HIGH frequencies relate to the default frequencies specified in the Bluetooth RF test specification. The MT8850A allows all these frequencies to be changed from their default values.

1. Choose Output power from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

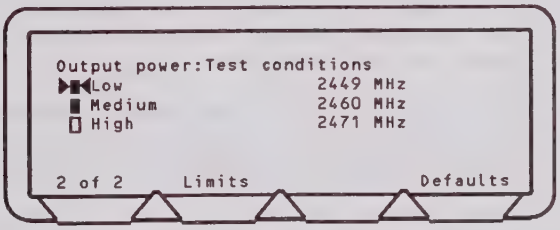
   If a test is selected, the box will be filled in. If not selected the box will be hollow.
3. Press the **[Setup]** soft key.

   The Output power test conditions screens are displayed.



The Hopping test mode can be set to Defined, All or Any. You can also choose the test type, loopback or TX, to use and set the packet type.

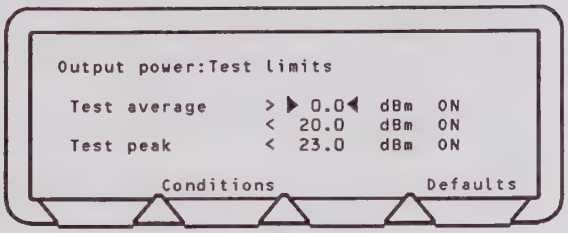
4. Choose Hopping test mode.
5. Press the **Sel** key to switch between Defined, All and Any.
6. Choose No. of packets.
7. Enter the value using the keypad.
8. Choose Test type.
9. Press the **Sel** key to switch between Loopback and TX.
10. Choose Packet type.
11. Press the **Sel** key repeatedly until the required packet type, Longest, DH1, DH3 or DH5 is displayed. Longest sets the packet type to the longest length that the EUT supports during the link setup process.
12. Press the **[1 of 2]** soft key to move to the second screen.



You can select or deselect the test to run and make changes to the frequency.

When the Hopping test mode is set to All or Any, the Low, Medium and High frequencies are not applicable and they are displayed as hollow ellipses.

13. To select or deselect a test, choose the test and press the **Sel** key.
14. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
15. Press the **[Default]** soft key to restore the default values.
16. Press the **[Limits]** soft key to display the Output power test limits screen.



17. Press the **[Default]** soft key to restore the default values.
18. Choose the limit you want to change.
19. Press the **Sel** key and enter the new limit using the keypad.
20. Press the **[Enter]** soft key.
21. Press the **[Conditions]** soft key to return to the test conditions screen.
22. Press the **Back** key to return to the Script menu.

Setting up the power control test

The power control test performs power measurement cycles on the EUT output, if the EUT supports power control, at each of the defined frequencies (LOW, MEDIUM and HIGH). This measurement is always performed with hopping off. The MT8850A can perform the test using either loopback test control or TX test control. The default form for this test is to use loopback. The following test is described using the default test control.

The MT8850A transmits a DH1 (or the operator selected packet type) packet with a pseudo random data payload (PRBS 9). This test is performed with hopping off. The LOW, MEDIUM and HIGH frequency sets relate to the default frequencies specified in the Bluetooth RF test specification. The MT8850A allows all the frequencies to be changed.

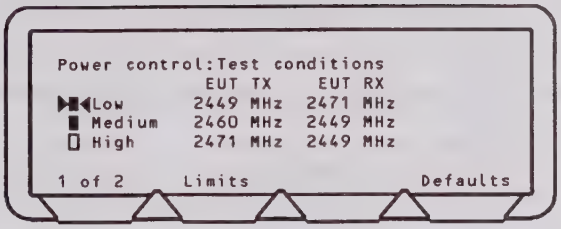
A power measurement cycle sets the EUT output power to its maximum and then steps the power down to the minimum power and then up to the maximum again one step at a time. For each power step a number of data packets are sent to the EUT and looped back to the MT8850A.

> When the test is performed in TX test mode only the TX frequency settings are used since both RX and TX frequencies must be the same.

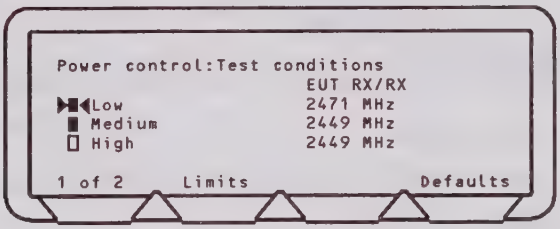
1. Choose Power control from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

   If a test is selected, the box will be filled in. If not selected the box will be hollow.
3. Press the **[Setup]** soft key.

   The Power control test conditions screens are displayed. This will vary according to whether the Test type is in Loopback or TX mode. The following screen is in Loopback mode.

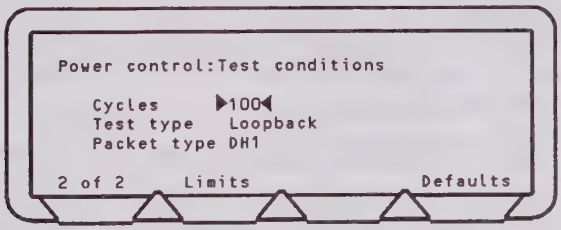

Power control:Test conditions
EUT TX EUT RX
Low 2449 MHz 2471 MHz
Medium 2460 MHz 2449 MHz
High 2471 MHz 2449 MHz
1 of 2 Limits Defaults

The following screen is in TX mode.



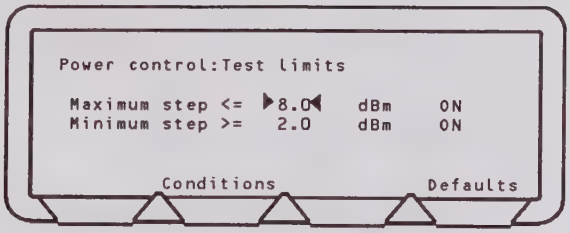
You can select or deselect the test to run and make changes to the frequency values shown.

4. To select or deselect a test, choose the test and press the **Sel** key.
5. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
6. Press the **[1 of 2]** soft key to move to the second screen.



You can change the number of cycles. In one cycle the EUT goes from maximum to minimum power then returns to maximum power one power step at a time. You can also change the test type and packet type.

7. Choose Cycles.
8. Enter the value using the keypad.
9. Choose Test type.
10. Press the **Sel** key to switch between Loopback and TX.
11. Choose Packet type.
12. Press the **Sel** key to switch between DH1, DH3 and DH5.
13. Press the **[Default]** soft key to restore the default values.
14. Press the **[Limits]** soft key to display the Power control test limits screen.



15. Press the **[Default]** soft key to restore the default values.
16. Choose the limit you want to change.
17. Press the **Sel** key and enter the new limit using the keypad.
18. Press the **[Enter]** soft key.
19. Press the **[Conditions]** soft key to return to the test conditions screen.
20. Press the **Back** key to return to the Script menu.

Setting up the initial carrier test

The initial carrier test performs a frequency accuracy test on a DH1 pseudo random data packet. (PRBS 9) This test can be performed using either the loopback test control or the TX test control. The default is to use the loopback test control. This test can be made with either hopping on or off.

With hopping off, the MT8850A measures the initial carrier frequency error at the three frequencies defined on the LOW, MEDIUM and HIGH set up screen. The number of packets measured at each frequency is set by the user in the "Number of packets" field. This is the test method described in the Bluetooth RF Test Specification for an initial carrier frequency test with hopping off.

With hopping on, the MT8850A can make the measurement in one of two ways.

If Hopping On mode is set to "All", the MT8850A will measure the initial carrier frequency at every one of the 79 frequencies in the Bluetooth channel structure. The number of packets measured at each frequency is set by the user in the "Number of packets" field. This is the test method described in the Bluetooth RF Test Specification for an initial carrier frequency test with hopping on.

If Hopping On mode is set to "Any" the MT8850A measures the power at the next frequency that the link hops to after the previous initial carrier frequency measurement has been completed. The total number of packets measured is set by the user in the "Number of packets" field. This is typically the shortest option as there is no requirement to measure a large number of packets at every frequency.

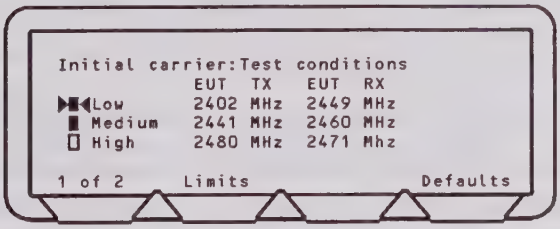
When the measurement is made using TX mode the MT8850A sets up the EUT so that when the EUT is polled it transmits a DH1 packet with a pseudo random payload for each of the frequencies selected (LOW, MEDIUM and HIGH). This test can be performed with hopping off and on. The LOW, MEDIUM and HIGH frequencies relate to the default frequencies specified in the Bluetooth RF test specification. The MT8850A allows all the frequencies to be changed. When the test is performed in TX test mode EUT transmitter and receiver frequencies must be the same.

1. Choose Init carrier from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

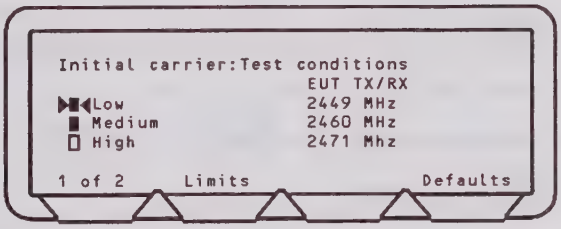
If a test is selected, the box will be filled in. If not selected the box will be hollow.

3. Press the **[Setup]** soft key.

   The Initial carrier test conditions screens are displayed. The following screen is in Loopback mode.



   The following screen is in TX mode.

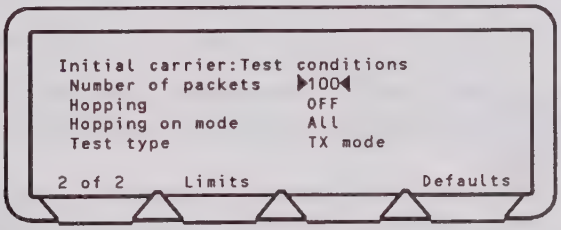


   You can select or deselect the test to run and make changes to the frequency values shown.

4. To select or deselect a test, choose the test and press the **Sel** key.

5. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.

6. Press the **[1 of 2]** soft key to move to the second screen.



   This screen lets you enter the number of packets to send, switch hopping on or off and change test type. If hopping is on you can change the mode.

7. Choose Number of packets.

8. Enter the number of packets using the keypad.

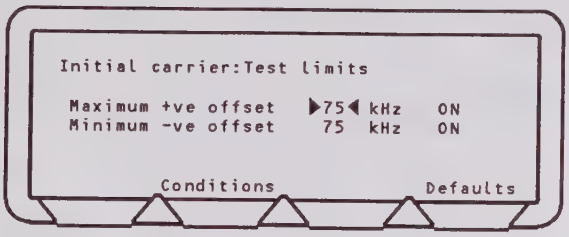
9. Choose Hopping.

10. Press the **Sel** key to switch between ON and OFF. If you choose ON, choose Hopping test mode and press the **Sel** key to switch between All and Any.

11. Choose Test type.

12. Press the **Sel** key to switch between Loopback and TX.

13. Press the **[Default]** soft key to restore the default values.
14. Press the **[Limits]** soft key to display the Initial carrier test limits screen.



15. Press the **[Default]** soft key to restore the default values.
16. Choose the limit you want to change.
17. Press the **Sel** key and enter the new limit using the keypad.
18. Press the **[Enter]** soft key.
19. Press the **[Conditions]** soft key to return to the test conditions screen.
20. Press the **Back** key to return to the Script menu.

Setting up the carrier drift test

The carrier drift test performs a frequency drift measurement over the length of the packet received. The test can be carried out for each of the supported packet types with either hopping on or hopping off. This test can be performed using either the loopback test control or the TX test control. The default is to use the loopback test control.

In loopback mode with hopping off, the MT8850A sends DH1, DH3 and DH5 packets with a 10101010.... payload at each of the frequencies selected (LOW, MEDIUM and HIGH). The EUT returns the DH1, DH3 or DH5 packet for measurement. The LOW, MEDIUM and HIGH frequencies relate to the default frequencies specified in the Bluetooth RF test specification. The number of packets of each length that are measured is set in the "Number of packets" field. The MT8850A allows all the frequencies to be changed. This is the test method described in the Bluetooth RF Test Specification for a carrier frequency drift test with hopping off.

In loopback mode with hopping on, and hopping on mode set to "All" the MT8850A sends DH1, DH3 and DH5 packets with a 10101010.... payload. The EUT returns the DH1, DH3 or DH5 packet for measurement. The MT8850A will measure the carrier frequency drift for each packet length at every one of the 79 frequencies in the Bluetooth channel structure. The number of packets of each length that are measured is set in the "Number of packets" field. This is the test method described in the Bluetooth RF Test Specification for a carrier frequency drift test with hopping on.

In loopback mode with hopping on, and hopping on mode set to "Any" the MT8850A sends DH1, DH3 and DH5 packets with a 10101010.... payload. The EUT returns the DH1, DH3 or DH5 packet for measurement. The MT8850A will measure the carrier frequency drift at the next frequency that the link hops to after the previous carrier frequency drift measurement has been completed. The number of packets of each length that are measured is set in the "Number of packets" field.

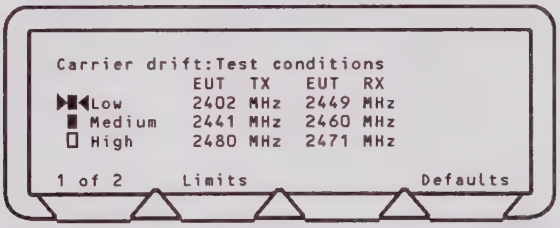
In TX mode with hopping on or off the measurement process is the same as for loopback except that the MT8850A does not send full DHX packets but just POLL packets. The EUT has been configured by the MT8850A to respond to a POLL with the appropriate DHX

packet. The EUT must support TX mode part of the Test Mode specification for this to work. The test time is much shorter when run using TX mode compared with loopback, as the MT8850A does not have to send full packet lengths. When the test is performed in TX test mode EUT transmitter and receiver frequencies must be the same. For this test the TX and RX frequencies are the same. TX mode complies with the Bluetooth RF Test Specification for a carrier frequency drift test.

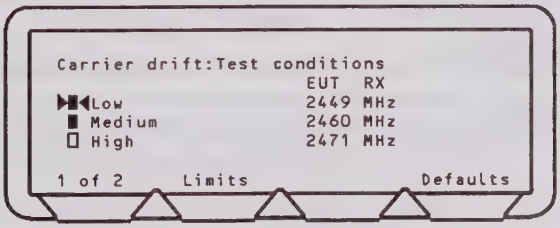
1. Choose Carrier drift from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

   If a test is selected, the box will be filled in. If not selected the box will be hollow.
3. Press the **[Setup]** soft key.

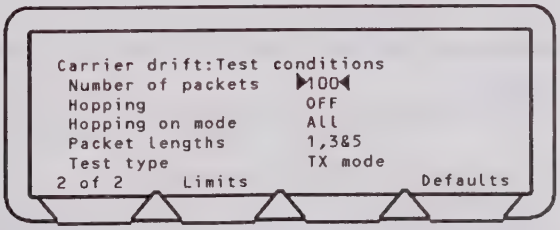
   The Carrier drift test conditions screens are displayed. The following screen is in Loopback mode.



   The following screen is in TX mode.

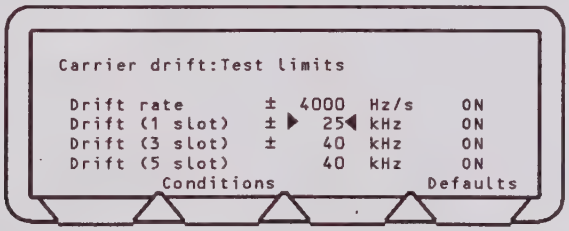


   You can select or deselect the test to run and make changes to the frequency values shown.
4. To select or deselect a test, choose the test and press the **Sel** key.
5. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
6. Press the **[1 of 2]** soft key to move to the second screen.



   This screen lets you enter the number of packets to send, switch hopping on or off. If hopping is on you can change the mode. You are also able to set the length of the packets and change the test type.
7. Choose Number of packets.

8. Enter the number of packets using the keypad.
9. Choose Hopping.
10. Press the **Sel** key to switch between ON, OFF or ON & OFF. If you choose ON, choose Hopping test mode and press the **Sel** key to switch between All and Any.
11. Choose Packet lengths.
12. Press the **Sel** key to switch between:
    - 1
    - 3
    - 5
    - 1&3
    - 1&5
    - 3&5
    - 1,3&5
13. Choose Test type.
14. Press the **Sel** key to switch between Loopback and TX.
15. Press the **[Default]** soft key to restore the default values.
16. Press the **[Limits]** soft key to display the Carrier drift test limits screen.


Carrier drift:Test limits
Drift rate ± 4000 Hz/s ON
Drift (1 slot) ± ▶ 25◀ kHz ON
Drift (3 slot) ± 40 kHz ON
Drift (5 slot) 40 kHz ON
Conditions
Defaults

17. Press the **[Default]** soft key to restore the default values.
18. Choose the limit you want to change.
19. Press the **Sel** key and enter the new limit using the keypad.
20. Press the **[Enter]** soft key.
21. Press the **[Conditions]** soft key to return to the test conditions screen.
22. Press the **Back** key to return to the Script menu.

Setting up the single slot sensitivity test

For a single slot sensitivity measurement the MT8850A transmits DH1 packets with a pseudo random payload (PRBS 9) to the EUT at a minimum power level. If the dirty transmitter parameters are applied, then every 20 mS the MT8850A changes the transmitter parameters as specified in the dirty transmitter table for this test. The EUT loops back the received data and a bit error rate (BER) calculation and frame error rate (FER) calculation is performed by the MT8850A test set. The test is repeated for each of

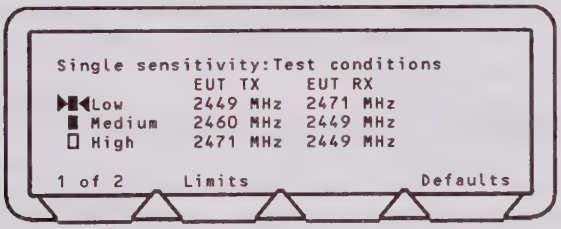
the frequencies selected (LOW, MEDIUM and HIGH). This test is performed with hopping off. The LOW, MEDIUM and HIGH frequencies relate to the default frequencies specified in the Bluetooth RF test specification. The MT8850A allows all the frequencies to be changed. This is the test method described in the Bluetooth RF Test Specification for a single slot sensitivity test with hopping off.

The MT8850A can also carry out this test with hopping on.

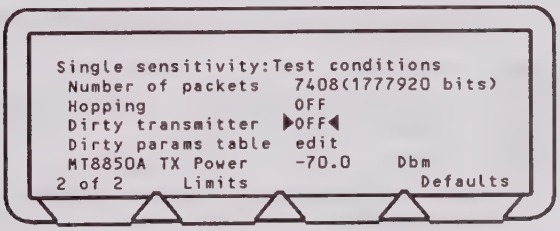
1. Choose Single sensitivity from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

   If a test is selected, the box will be filled in. If not selected the box will be hollow.
3. Press the **[Setup]** soft key.

   The Single sensitivity test conditions screens are displayed.



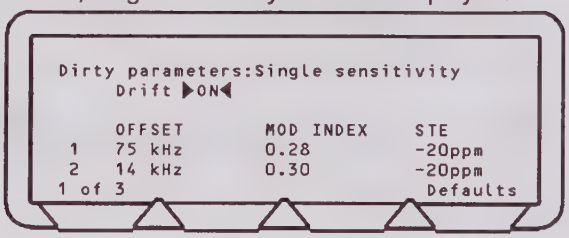
   You can select or deselect the test to run and make changes to the frequency values shown.
4. To select or deselect a test, choose the test and press the **Sel** key.
5. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
6. Press the **[1 of 2]** soft key to move to the second screen.



   This screen lets you enter the number of packets to send, choose how hopping is implemented. You can also switch the dirty transmitter On, Off, or On and Off. When the Dirty transmitter is switched on you can edit the Dirty parameter table.
7. Choose Number of packets.
8. Enter the number of packets using the keypad.
9. Choose Hopping.
10. Press the **Sel** key to switch between ON, OFF and ON&OFF.
11. Choose Dirty transmitter.
12. Press the **Sel** key to switch between ON and OFF.

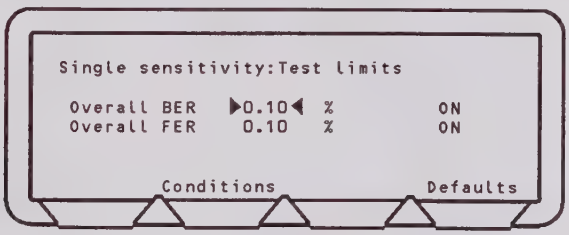
13. Choose Dirty params table edit.
14. Press the **Sel** key.

    The Dirty parameters, Single sensitivity screen is displayed.



    10 entries are displayed on three screens. The Drift selection is only available on the first screen. You can make changes to the OFFSET frequency values, MODULATION INDEX and SYMBOL TIMING ERROR (STE) shown.
15. Choose Drift on screen 1 of 3.
16. Press the **Sel** key to switch between ON and OFF.

    With Drift set to ON, the MT8850A transmits with a sine wave, frequency modulation, with a deviation of ±25 kHz, rate 1.6 kHz, synchronised to zero phase at the packet start.
17. To change any of the OFFSET, MOD INDEX and STE, choose the item, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
18. Press the **Back** key to return to the Single sensitivity test conditions screen 1.
19. Press the **[Default]** soft key to restore the default values.
20. Press the **[Limits]** soft key to display the Single sensitivity test limits screen.



21. Press the **[Default]** soft key to restore the default values.
22. Choose the limit you want to change.
23. Press the **Sel** key and enter the new limit using the keypad.
24. Press the **[Enter]** soft key.
25. Press the **[Conditions]** soft key to return to the test conditions screen.
26. Press the **Back** key to return to the Script menu.

Setting up the multi-slot sensitivity test

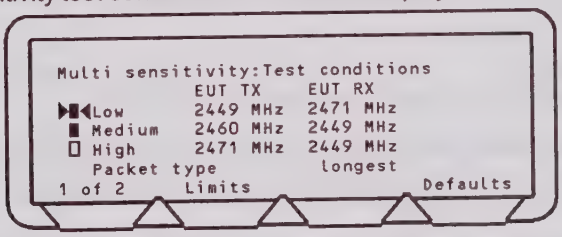
For a multi slot sensitivity measurement the MT8850A transmits the longest supported packet type as reported by the EUT during link set up with a pseudo random payload (PRBS 9) to the EUT at a minimum power level. If the dirty parameters are enabled then every 20 mS the MT8850A changes the transmitter parameters as specified in the dirty transmitter table for this test. The EUT loops back the received data and a bit error rate (BER) calculation and frame error rate (FER) calculation is performed by the MT8850A test set. This test is performed with hopping off. Measurements are made at each of the frequencies selected (LOW, MEDIUM and HIGH). The LOW, MEDIUM and HIGH frequencies relate to the default frequencies specified in the Bluetooth RF test specification. The MT8850A allows all the frequencies to be changed. This is the test method described in the Bluetooth RF Test Specification for a multi slot sensitivity test with hopping off.

The MT8850A can also carry out this test with hopping on.

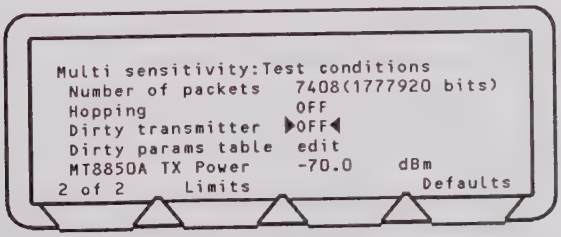
1. Choose Multi sensitivity from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

   If a test is selected, the box will be filled in. If not selected the box will be hollow.
3. Press the **[Setup]** soft key.

   The Multi sensitivity test conditions screens are displayed.



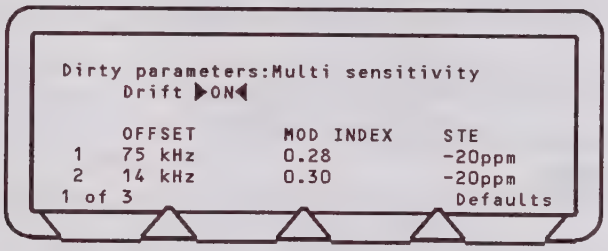
   You can select or deselect the test to run and make changes to the frequency values shown.
4. To select or deselect a test, choose the test and press the **Sel** key.
5. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
6. Press the **[1 of 2]** soft key to move to the second screen.



   This screen lets you enter the number of packets to send, choose how hopping is implemented. You can also switch the dirty transmitter On, Off, or On and Off. When the Dirty transmitter is switched on you can edit the Dirty parameter table.
7. Choose Number of packets.

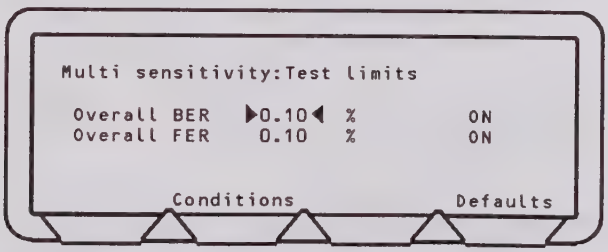
8. Enter the number of packets using the keypad.
9. Choose Hopping.
10. Press the **Sel** key to switch between ON, OFF and ON&OFF.
11. Choose Dirty transmitter.
12. Press the **Sel** key to switch between ON and OFF.
13. Choose Dirty params table edit.
14. Press the **Sel** key.

    The Dirty parameters, Multi sensitivity screen is displayed.



    10 entries are displayed on three screens. The Drift selection is only available on the first screen. You can make changes to the OFFSET frequency values, MODULATION INDEX and SYMBOL TIMING ERROR (STE) shown.
15. Choose Drift on screen 1 of 3.
16. Press the **Sel** key to switch between ON and OFF.

    With Drift set to ON, the MT8850A transmits with a sine wave, frequency modulation, with a deviation of ±40 kHz, rate 500 Hz (3 slots) 0r 300 Hz (5 slots), synchronised to zero phase at the packet start.
17. To change any of the OFFSET, MOD INDEX and STE, choose the item, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
18. Press the **Back** key to return to the Multi sensitivity test conditions screen 1.
19. Press the **[Default]** soft key to restore the default values.
20. Press the **[Limits]** soft key to display the Multi sensitivity test limits screen.



21. Press the **[Default]** soft key to restore the default values.
22. Choose the limit you want to change.
23. Press the **Sel** key and enter the new limit using the keypad.

24. Press the **[Enter]** soft key.
25. Press the **[Conditions]** soft key to return to the test conditions screen.
26. Press the **Back** key to return to the Script menu.

Setting up the modulation index test

This test measures the modulation characteristics on the EUT output for each of the frequency ranges selected (LOW, MEDIUM and HIGH). The MT8850A can perform the test using either loopback test controls or TX test controls. The default form for this test is to use loopback. The following test is described using the default test control.

The MT8850A transmits a number of packets containing the four ones four zeros payload (11110000), which are looped back by the EUT. Then packets with the alternate ones and zeros (101010101) payload are transmitted and are looped back by the EUT. These packets are the longest supported packet type as reported by the EUT during link set up (DH1, DH3 or DH5) or the selected packet type.

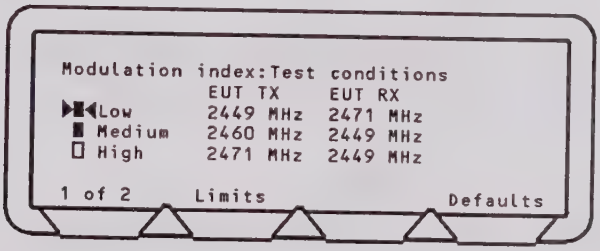
This test is performed with hopping off, and the test is repeated until the number of packets has been measured on each of the selected frequencies as set in the "Number of packets" field. The LOW, MEDIUM and HIGH frequencies relate to the default frequencies specified in the Bluetooth RF test specification. The MT8850A allows all the frequencies to be changed.

When the test is performed in TX test mode EUT transmitter and receiver frequencies must be the same.

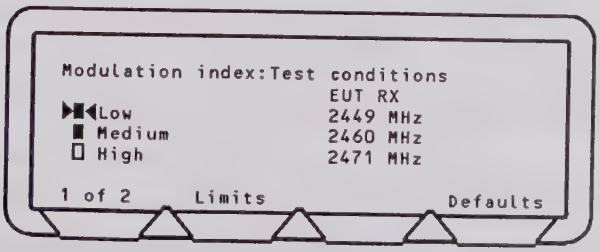
1. Choose Mod index from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

   If a test is selected, the box will be filled in. If not selected the box will be hollow.
3. Press the **[Setup]** soft key.

   The Modulation index test conditions screens are displayed. The following screen is in Loopback mode.

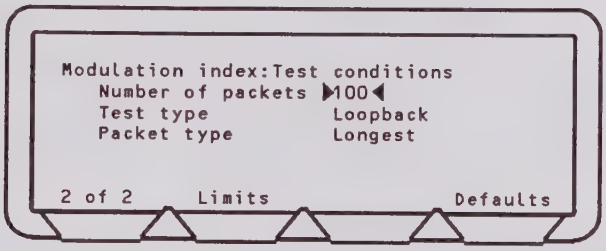


The following screen is in TX mode.



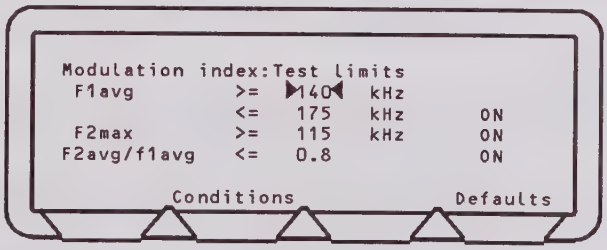
You can select or deselect the test to run and make changes to the frequency values shown.

4. To select or deselect a test, choose the test and press the **Sel** key.
5. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
6. Press the **[1 of 2]** soft key to move to the second screen.



You can change the number of cycles, the test type and packet type.

7. Choose Cycles.
8. Enter the value using the keypad.
9. Choose Test type.
10. Press the **Sel** key to switch between Loopback and TX.
11. Choose Packet type.
12. Press the **Sel** key to switch between Longest, DH1, DH3 or DH5.
13. Press the **[Default]** soft key to restore the default values.
14. Press the **[Limits]** soft key to display the Modulation index test limits screen.



15. Press the **[Default]** soft key to restore the default values.
16. Choose the limit you want to change.
17. Press the **Sel** key and enter the new limit using the keypad.
18. Press the **[Enter]** soft key.
19. Press the **[Conditions]** soft key to return to the test conditions screen.
20. Press the **Back** key to return to the Script menu.

Setting up the maximum input power test

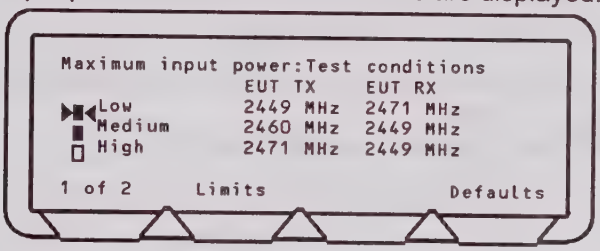
For the EUT maximum input power test the MT8850A transmits a pseudo random payload (PRBS 9) DH1 data packet to the EUT so that the EUT receives the signal at a power level of -20 dBm. The EUT loops back the received data and a bit error rate (BER)

calculation and frame error rate (FER) calculation is performed by the MT8850A test set. The test is repeated for each of the frequency ranges selected (LOW, MEDIUM and HIGH). This test is performed with hopping off. The LOW, MEDIUM and HIGH frequencies relate to the default frequencies specified in the Bluetooth RF test specification. The MT8850A allows all the frequencies to be changed.

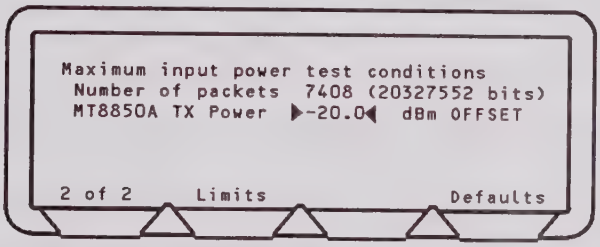
1. Choose Input power from the Script menu.
2. Press the **Sel** key to select or deselect this test from the script routine.

   If a test is selected, the box will be filled in. If not selected the box will be hollow.
3. Press the **[Setup]** soft key.

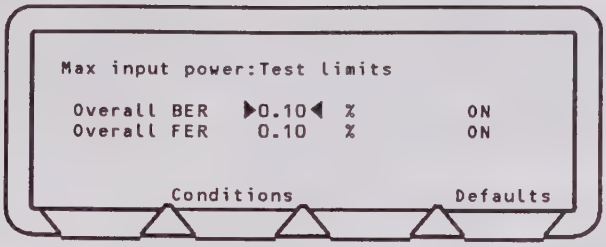
   The Maximum input power test conditions screens are displayed.



   You can select or deselect the test to run and make changes to the frequency values shown.
4. To select or deselect a test, choose the test and press the **Sel** key.
5. To change a frequency, choose the frequency, press the **Sel** key, enter the value using the keypad and press the **[Enter]** soft key.
6. Press the **[1 of 2]** soft key to move to the second screen.



   You can enter the number of packets to be sent and enter the MT8850A transmission power offset value.
7. Choose Number of packets, and press the **Sel** key.
8. Enter the number of packets from the keypad and press the **[Enter]** soft key.
9. Choose MT8850A Power, enter the value from the keypad and press the **Sel** key.
10. Enter the value from the keypad and press the **[Enter]** soft key.
11. Press the **[Default]** soft key to restore the default values.
12. Press the **[Limits]** soft key to display the Maximum input power test limits screen.



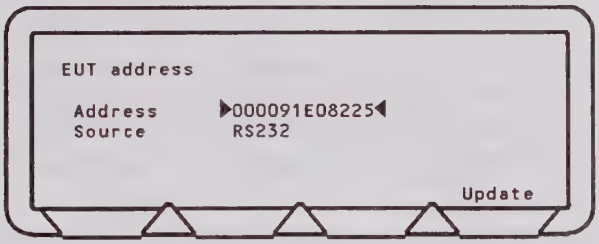
13. Press the **[Default]** soft key to restore the default values.
14. Choose the limit you want to change.
15. Press the **Sel** key and enter the new limit using the keypad.
16. Press the **[Enter]** soft key.
17. Press the **[Conditions]** soft key to return to the test conditions screen.
18. Press the **Back** key to return to the Script menu.

Entering the BT address of the EUT

You can enter the address of the equipment under test in any of three ways, through the RS232 port that is communication with the HCI port of the equipment, manually entering the address or using the Inquiry feature of the MT8850A.

1. With the Script menu displayed, press the **[EUT addr]** soft key.

   The EUT address screen is displayed.



   At power up when the source is RS232, "No address" will be displayed.
2. Press the **[Update]** soft key to display the EUT.

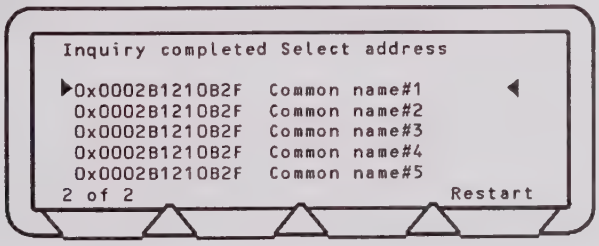
To change the source and enter the address:

1. Choose the Source.
2. Press the **Sel** key to switch between RS232, Manual and Inquiry.
3. ***For manual***, press the **[Update]** soft key and enter the hexadecimal address for EUT from the keypad.

   Alternatively, choose the Address field, press the **Sel** key and enter the hexadecimal address for EUT from the keypad.
4. ***For Inquiry***, press the **[Update]** soft key to initiate the Inquiry.

   The Inquiry will run according to the configuration settings of the MT8850A (see page 7-5).
5. Press the **[Stop]** soft key to halt the Inquiry.

   The Inquiry completed screen is displayed.



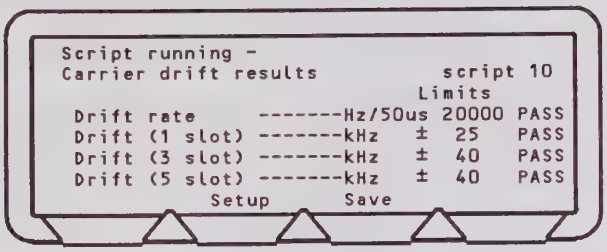
   The Common name is the user friendly name truncated to fit the line on the screen. You can restart the Inquiry using the **[Restart]** soft key.
6. Choose the address required.
7. Press the **Sel** key to enter the address.

Running a single test

Any test can be run on its own.

1. Choose the test that you want to run.
2. Press the **[Single]** soft key.

   The relevant results screen for the test is displayed.



   From this screen you are able to set up the test and save this setup information to be used for future tests.
3. Press the **[Setup]** soft key to go the setup screen for the chosen test. See page 8-6 for details of using the setup screens.
4. Press the **[Save]** soft key to save the setup information.
5. Press the **Run** hard key to run the test once or:

   Press the **Loop/Stop** hard key to run the test according to the configuration settings of the MT8850A (see page 7-14). Press the **Loop/Stop** hard key again to stop the test.
6. The test results are displayed. Results are described starting on page 8-27).

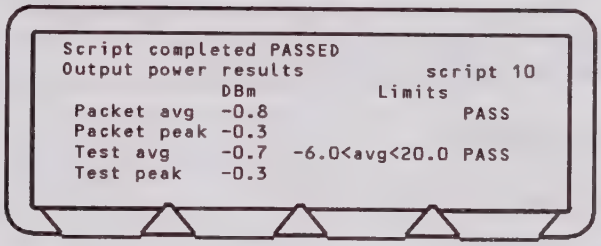
Viewing test results

The results screens show pass or fail results for test limits set to ON. These screens are for information only and you are not able to change any of the details.

Output power test results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

   The Output power results screen is displayed.

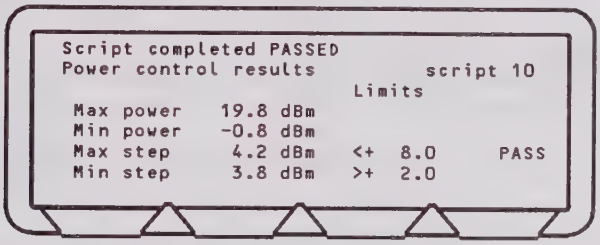


3. Press the **Back** key to return to the Script menu.

Power control test results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

   The Power control results screen is displayed.

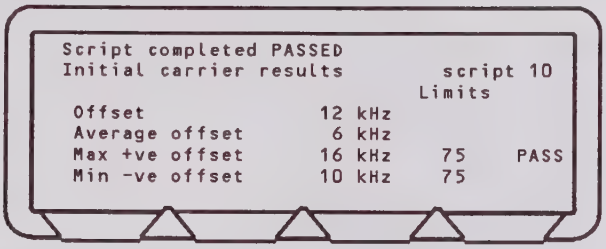


3. Press the **Back** key to return to the Script menu.

Initial carrier test results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

   The Initial carrier results screens are displayed.

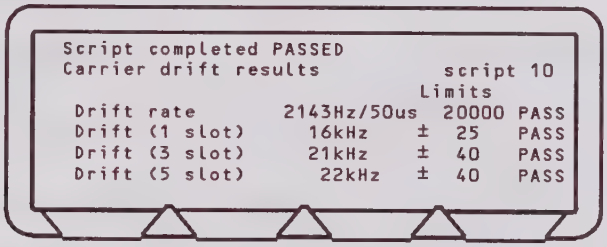


3. Press the **Back** key to return to the Script menu.

Carrier drift test results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

   The Carrier drift results screen is displayed.

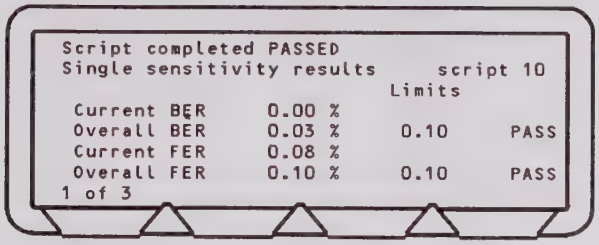

Script completed PASSED
Carrier drift results
script 10
Limits
Drift rate 2143Hz/50us 20000 PASS
Drift (1 slot) 16kHz ± 25 PASS
Drift (3 slot) 21kHz ± 40 PASS
Drift (5 slot) 22kHz ± 40 PASS

3. Press the **Back** key to return to the Script menu.

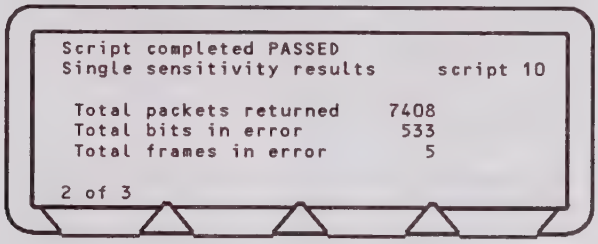
Single slot sensitivity results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

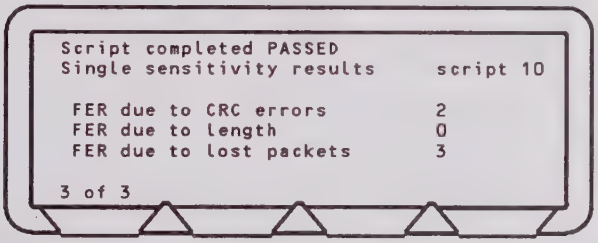
   The Single sensitivity results screens are displayed.


Script completed PASSED
Single sensitivity results script 10
Limits
Current BER 0.00 %
Overall BER 0.03 % 0.10 PASS
Current FER 0.08 %
Overall FER 0.10 % 0.10 PASS
1 of 3

3. Press the **[1 of 3]** soft key to move to the second screen.


Script completed PASSED
Single sensitivity results script 10
Total packets returned 7408
Total bits in error 533
Total frames in error 5
2 of 3

4. Press the **[2 of 3]** soft key to move to the third screen.

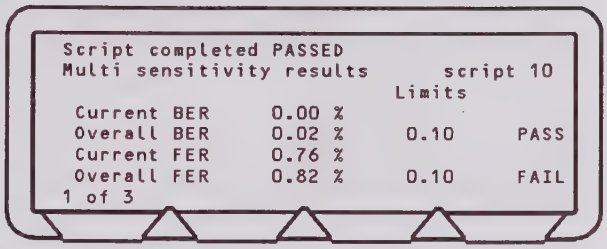

Script completed PASSED
Single sensitivity results script 10
FER due to CRC errors 2
FER due to length 0
FER due to lost packets 3
3 of 3

5. Press the **Back** key to return to the Script menu.

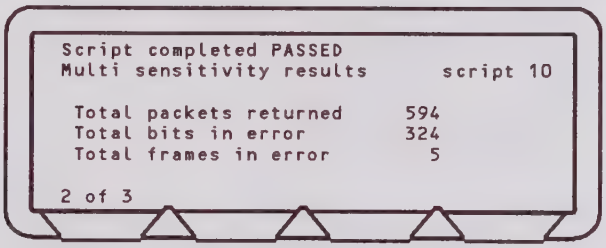
Multi-slot sensitivity test results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

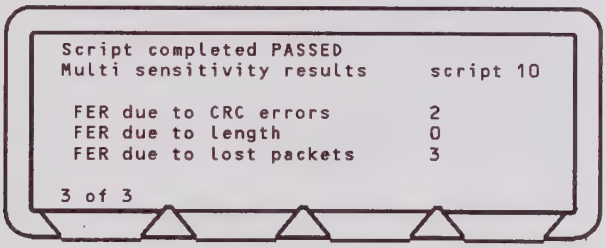
   The Multi sensitivity results screens are displayed.


Script completed PASSED
Multi sensitivity results script 10
Limits
Current BER 0.00 %
Overall BER 0.02 % 0.10 PASS
Current FER 0.76 %
Overall FER 0.82 % 0.10 FAIL
1 of 3

3. Press the **[1 of 3]** soft key to move to the second screen.


Script completed PASSED
Multi sensitivity results script 10
Total packets returned 594
Total bits in error 324
Total frames in error 5
2 of 3

4. Press the **[2 of 3]** soft key to move to the third screen.

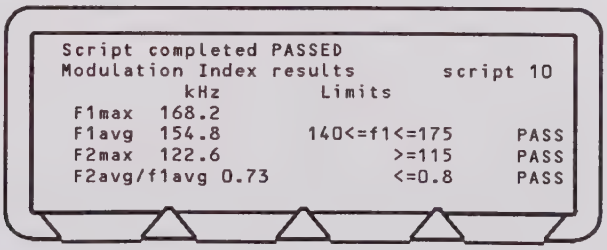

Script completed PASSED
Multi sensitivity results script 10
FER due to CRC errors 2
FER due to length 0
FER due to lost packets 3
3 of 3

5. Press the **Back** key to return to the Script menu.

Modulation index test results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

   The Output power results screen is displayed.

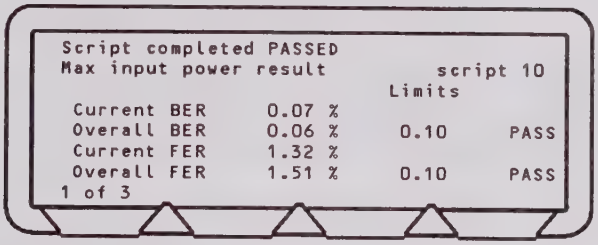


3. Press the **Back** key to return to the Script menu.

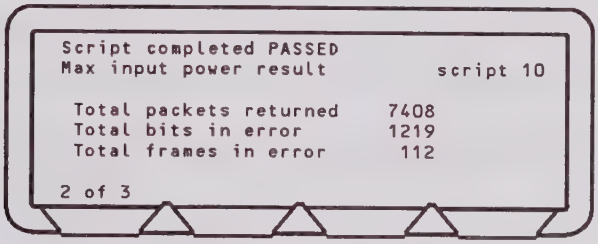
Maximum input power test results

1. Choose Output power from the Script menu.
2. Press the **[Results]** soft key.

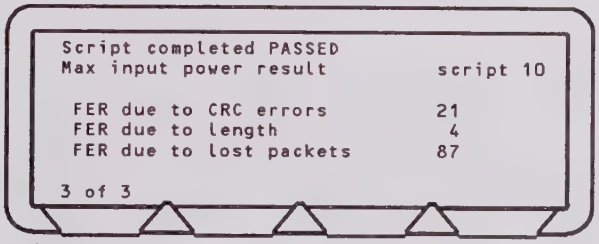
   The Maximum input power results screen is displayed.



3. Press the **[1 of 3]** soft key to move to the second screen.



4. Press the **[2 of 3]** soft key to move to the third screen.


Script completed PASSED
Max input power result
script 10
FER due to CRC errors 21
FER due to length 4
FER due to lost packets 87
3 of 3

5. Press the **Back** key to return to the Script menu.

Appendix A. Top-line Messages

Introduction

The top line of LCD is reserved for conveying various types of information to the user. The 40 characters of this line are formatted as follows:

- The left most 30 characters are reserved for text messages of varying lengths with maximum of 30 characters. All messages are left justified.
- The right most 9 characters are reserved for Icons/characters for specific instrument features
- The character is left blank between the message and the icons/characters to provide separation for clarity

Message types

Each message type carries a particular kind of information. This consists of the following types of information:

Status	This indicates the internal state of the instrument such as: "Script running" "Script completed" This may be augmented by Measurement status message if relevant such as: "No payload detected " "Searching for channel" These two types of messages, when present, are displayed alternately.
Error	This can be an internal or operator error The cause of operator error, as the name implies, is an incorrect operation of the MT8850A, during setup/running of a test e.g. setup of out-of-range limit value for the pass/fail test criteria, results in the message " >Error!< out of range value"
Warning	This warns you of: Abnormal condition such as: "Warning: over temperature". Non-standard set up of an instrument such as: Null Packets. The icon "!" indicates this condition Conditions outside the control of MT8850A such as: "Warning: EUT via RF (0x%x)" (see page A-2)
Information	This provides you with helpful information where relevant. For example, EUT (equipment under test) address mode: if the manual mode is selected following the auto, the unit disconnects from the EUT and the following message is displayed: "EUT disconnected"
Safety	The safety here refers to the MT8850A safety such as: " SYSTEM SHUTTING DOWN" " INTERNAL TEMPERATURE EXCEEDED"

Message priorities

1) MESSAGE PRIORITIES

All status messages are mutually exclusive for example:

"Making connection"

"Connection made"

Script running"

Depending on the use of instrument, more than one message type can be displayed.

For example, the messages "Null packets mode" and "Script running" may be displayed alternately:

On loss of connection, "Null packets mode" and "Connection lost" will be displayed:

Some message such as ">Error! < minimum value is ------" are displayed for a short period (2 seconds).

The safety message is exception to above set of rules. It has the highest priority, over riding any current messages. Example of safety message:

"SYSTEM SHUTTING DOWN INTERNAL TEMPERATURE EXCEEDED"

Error codes

HCI (Host Controller Interface) EUT communication errors

Typically these errors are caused by conditions outside the control of MT8850A. For example, when the connection to EUT is lost because of no response from it or a command is not supported by the EUT. The text messages are displayed for all the conditions that are likely to occur often and generic messages with unique error codes for the others. For example the text message: " No connection made, timed out"; generic message: "Warning :via RF comm (0x%x)

Message display/clear conditions

These are summarised in the following table:

Key:

- "text" represents soft/hard key e.g. "Run", "Abort" etc
- The dash after message represents rotating paddle e.g. "Script running –"
- State refers to the MT8850A internal state. You can initiate the change of state by pressing "Run", for example or it can occur on completion of a System task such as connection made

Top Line Message			Message Conditions	
No.	**Message**	**Type**	**For Display**	**For Clearance**
1	Script running	Overall status	"Run" pressed in Script menu	Change of state
2	Script stopping	Overall status	"Loop/stop" pressed during run	Change of state
3	Script running in loop	Overall status	"Loop/Stop" in Script menu	Change of state
4	Script passed Connection held	Overall status	End of script run with all selected tests passed	Overall status
5	Script failed Connection held	Overall status	End of script run with one or more selected test failed	Change of state
6	Script aborted Connection held	Overall status	"Abort" in script run menu	Change of state
7	Test running		"Run" in single test	Change of state
8	Test stopping		"Loop/stop" during single test run	Change of state
9	Test running in loop	Overall status	"Loop/Stop" in Single test menu	Change of state
10	Test passed Connection held		At the end of selected test that has passed	Change of state
11	Test failed Connection held	Overall status	At the end of selected test that has failed	Change of state
12	Test aborted Connection held	Overall status	"Abort" during test run	Change of state
13	Inquiry in progress	Overall status	Inquiry selected as source in EUT address menu & "Update"	Change of state
14	Inquiry completed Select address	Overall status	Inquiry completed	Change of state
15	Inquiry stopped	Overall status	"Stop" during Inquiry task	Change of state
16	Inquiry completed No addresses	Overall status	MT8850A fails to find any addresses in its vicinity	Change of
17	Making connection	Overall status	When establishing connection	Change of state
18	Connection made	Overall status	On completion of successful connection	Change of state
19	Connection lost	Overall status	Connection lost during or in-between tests	Change of state

Top Line Message			Message Conditions	
No.	Message	Type	For Display	For Clearance
20	EUT disconnected	Overall status	MT8850A disconnects from EUT when: i) manual mode selected after auto (RS 232) ii) user initiates disconnect via MT8850A menu	Change of state
21	Searching for channel	Measurement status	Trying to find correct channel to test on	The condition no longer persists
22	Searching for sync word	Measurement status	Trying to find the sync word in the packet	The condition no longer persists
23	Incorrect packet length	Measurement status	The packet length is suspect	The condition no longer persists
24	No payload detected	Measurement status	Not enough power in the packet	The condition no longer persists
25	System auto-ranging	Measurement status	Measurement system changed range	The condition no longer persists
26	Invalid packet	Measurement status	Packet was seen to be invalid by the test routine	The condition no longer persists
27	Invalid packet type	Measurement status	Invalid packet type	The condition no longer persists
28	Null packets mode	Mode selection	On setting Null packets mode ON in MT8850A config. menu	On setting Null packets mode OFF in MT8850A config. menu
29	**MT8850A in slave mode** i) Slave status: Page scanning ii) Slave status: Connected iii) Slave status :Disconnected		When "Make me an EUT" selected in EUT control/Service menu Internal MT8850A status Internal MT8850A status	" EUT" switched OFF and "ON"
30	Warning□over temperature	Warning	When internal temperature exceeds Warning temp level	When internal temp falls below Warning temp level
31	SYSTEM SHUTTING DOWN INTERNAL TEMPERATURE EXCEEDED	Safety	When internal temp exceeds critical temp level	Message stays on for 10 seconds followed by system shutdown
32	External HCI interface	Overall status	When the menu item RS232 selected as EXT HCI	Change of state
33	Loop: current test failed	Overall status	When "Loop stop on test fail" selected in All scripts set-up menu & test failed in single test or script mode	Change of state
34	>Error!< in calibration mode	Operator error	When Run attempted in Calibration mode	Cleared after 2 seconds
35	>Error!< already in Run	Operator error	When Run attempted when already running	Cleared after 2 seconds
36	>Error!< non-editable script	Operator error	When an attempt made to change test parameters in Set up or Limits menus (Sel key pressed) for scripts 1 & 2	Cleared after 2 seconds

Top Line Message			Message Conditions	
No.	**Message**	**Type**	**For Display**	**For Clearance**
37	>Error!< locked script	Operator error	When an attempt made to change test parameters in Set up or Limits menus for any locked script	Cleared after 2 seconds
38	> Error!< out of range value	Operator error	When out of range value is entered in setup or limits	Cleared after 2 seconds
39	>Error!< maximum value is ---	Operator error	When out of range value is entered in setup or limits	Cleared after 2 seconds
40	>Error!< minimum value is ---	Operator error	When out of range value is entered in setup or limits	Cleared after 2 seconds
41	Unknown HCI command	HCI error	As per the message	Change of state
42	Requires connection	HCI error	As per the message	Change of state
43	Hardware failure	HCI error	As per the message	Change of state
44	No connection made, timed out	HCI error	As per the message	Change of state
45	Connection lost, no response	HCI error	As per the message	Change of state
46	Unsupported feature	HCI error	As per the message	Change of state
47	Connection ended by user	HCI error	As per the message	Change of state
48	Connection ended, low resource	HCI error	As per the message	Change of state
49	Connection ended, power off	HCI error	As per the message	Change of state
50	Connection ended by local host	HCI error	As per the message	Change of state
51	Unsupported feature by EUT	HCI error	As per the message	Change of state
52	Role change not allowed	HCI error	As per the message	Change of state
53	No LMP response, timed out	HCI error	As per the message	Change of state
54*	Warning:via RF comm ---	HCI error	See Appendix 6.1	Change of state
55*	Warning:direct comm ---	HCI error	See Appendix 6.1	Change of state
56*	Warning:EUT via RF ---	Internal HCI	See Appendix 6.2	Change of state
57*	Warning: EUT direct ---	Internal HCI	See Appendix 6.2	Change of state
58	Recovery cycle	TBD		

All the codes are in Hexadecimal to maintain compatibility with RF Specification.

HCI and Communication list of error codes

Error	Code Description
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0A	Max Number Of SCO Connections To A Device.
0x0B	ACL connection already exists.
0x0C	Command Disallowed.
0x0D	Host Rejected due to limited resources.
0x0E	Host Rejected due to security reasons.
0x0F	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: User Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Pairing Not Allowed.
0x19	Unknown LMP PDU.
0x1A	Unsupported Remote Feature.
0x1B	SCO Offset Rejected.
0x1C	SCO Interval Rejected.
0x1D	SCO Air Mode Rejected.
0x1E	Invalid LMP Parameters.

Error	Code Description
0x1F	Unspecified Error.
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed
0x22	LMP Response Timeout
0x23	LMP Error Transaction Collision
0x24	LMP PDU Not Allowed
0x25	Encryption Mode Not Acceptable
0x26	Unit Key Used
0x27	QoS is Not Supported
0x28	Instant Passed
0x29	Pairing with Unit Key Not Supported

Internal HCI and Communication list of error codes

Error	Code Description
0X51	Message from state controller unknown
0X52	Command from state controller unknown
0X53	Failed to create piconet
0X54	Disconnect returned fail
0x55	Failed to communicate to HCI comm. port
0X56	Timeout on reply from BBP HCI
0X57	HCI link returned fail
0X58	Missing event in protocol
0X59	Timed out waiting to receive the required measurements
0x5A	Did not receive a TX/LB end event
0x5B	The EUT has not been put into test mode
0 X5C	Core returned a hardware error event
0X5D	HCI command not implemented
0X5E	SYNC or invalid packet length error

Appendix B. Specification

This appendix provides the specification for the MT8850A Bluetooth Test Set.

Transmitter tests

Test	Measurement Range	Hop-ping	Test Mode	Loopback (Or TX)	Pay-load	Packets	Measurement Control
Output Power	Average power + 22 dBm to -35 dBm Peak power + 23 dBm to -35 dBm	ON	ON	Loopback	PRBS 9	Longest Supported	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Power Control	Average power +22 dBm to -35 dBm Power steps measured	OFF	ON	Loopback	PRBS 9	DH 1	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Modulation Characteristics	0 kHz to 350 kHz	OFF	ON	TX mode or loopback	10101010 and 11110000	Longest Supported	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Initial Frequency	±1 kHz to ±150 kHz	OFF and/or ON	ON	TX mode or loopback	PRBS 9	DH 1	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Frequency Drift	DH 1/3/5 packets 0 kHz to 200 kHz >20000 Hz/50µs	OFF and/or ON	ON	TX mode or loopback	1010....	All supported packet lengths	To Qualification specification Hopping On/Off, or user set; Low/Mid/High frequencies Number of returned packets

Receiver tests

Test	Measurement Range	Hop-ping	Test-Mode	Loopback (Or TX)	Payload	Packets	Measurement Control
Sensitivity Single slot Dirty transmitter	BER 0.00% to 100% FER 0.00% to 100%	OFF and/or ON	ON	Loopback	PRBS 9	DH 1	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Sensitivity Single slot Clean transmitter	BER 0.00% to 100% FER 0.00% to 100%	OFF and/or ON	ON	Loopback	PRBS 9	DH 1	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Sensitivity Multi slot Dirty transmitter	BER 0.00% to 100% FER 0.00% to 100%	OFF and/or ON	ON	Loopback	PRBS 9	DH 5 (or DH3 if DH5 not supported)	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Sensitivity Multi slot Clean transmitter	BER 0.00% to 100% FER 0.00% to 100%	OFF and/or ON	ON	Loopback	PRBS 9	DH 5 (or DH3 if DH5 not supported)	To Qualification specification or user set; Low/Mid/High frequencies Number of returned packets
Max. Input	BER 0.00% to 100% FER 0.00% to 100%	OFF	ON	Loopback	PRBS 9	DH 1	To Qualification specification Hopping On/Off, or user set; Low/Mid/High frequencies Number of returned packets

Output power

MT8850A measures average and peak power according to the Bluetooth RF Test Specification. Measurement of output power is made with the EUT in test mode, loopback enabled and hopping on. MT8850A transmits the longest supported packets and longest supported payload length, with a PRBS 9 payload. Power is measured at three defined frequencies. MT8850A identifies the position of p0 and measures the power of every bit in the packet.

Link conditions:

Hopping: ON

Test mode: ON

Loopback only

Payload: PRBS 9

Packet type: Longest supported

Measurement:

Supported measurements: Average power, peak power

Number of measurement frequencies: Three, default to qualification specification or user defined

Measurement range: +22 dBm to -35 dBm average power (+23 dBm peak power)

Resolution: 0.1 dB

Accuracy: +20 dBm to -35 dBm, ±1 dB

+22 dBm to +20 dBm, ±1.5 dB

Power control

MT8850A measures power control according to the Bluetooth RF Test Specification. Measurement of power control is made with the EUT in test mode, loopback enabled and hopping off. MT8850A transmits DH1 packets, with a PRBS 9 payload. Power control is measured at three defined frequencies. MT8850A uses standard LMP commands to set the EUT power. MT8850A identifies the position of p0 and measures the power of every bit in the packet.

Link conditions:

Hopping: OFF

Test mode: ON

Loopback only

Payload: PRBS 9

Packet type: DH1

Measurement:

Supported measurements: Average power at each power step, step size.

Number of measurement frequencies: Three, default to qualification specification or user defined

Measurement range: +22 dBm to -35 dBm average power (+23 dBm peak power)

Resolution: 0.1 dB

Accuracy:+20 dBm to -35 dBm, ±1 dB

+22 dBm to +20 dBm, ±1.5 dB

Modulation characteristics

MT8850A measures modulation characteristics according to the Bluetooth RF Test Specification.

Measurement of modulation characteristics is made with the EUT in test mode, loopback enabled and hopping off. MT8850A transmits longest supported packets, with the defined payload to the EUT.

Modulation characteristics are measured at three defined frequencies.

Link conditions:

- Hopping: OFF
- Test mode: ON
- Loopback or TX mode
- Payload: 11110000 and 10101010
- Packet type: Longest supported

Measurement:

- Supported measurements: Frequency deviation. Δf1max, Δf2max, Δf1avg, Δf2avg and (Δf2avg/Δf1avg)
- Number of measurement frequencies: Three, default to qualification specification or user defined
- RF input measurement range: +20 dBm to -35 dBm
- Deviation measurement range: 0 Hz to 350 kHz peak
- Deviation resolution: 1 kHz
- Accuracy: 1 kHz

Initial carrier frequency tolerance

MT8850A measures initial carrier frequency tolerance according to the Bluetooth RF Test specification.

Measurement of initial carrier frequency is made with the EUT in test mode, TX mode and hopping on and/or off. MT8850A transmits DH1 packets, with a PRBS 9 payload. Initial carrier frequency is measured at three defined frequencies. MT8850A identifies the position of p0 and measures the average frequency of the 4 preamble bits.

Link conditions:

Hopping: OFF and ON

Test mode: ON

Loopback or TX mode

Payload: PRBS 9

Packet type: DH1

Measurement:

Supported measurements: Initial carrier frequency error

Number of measurement frequencies: Three; default to qualification specification or user defined

RF input measurement range: +20 dBm to -35 dBm

Initial frequency error measurement range: 0 Hz to ±150 kHz

Frequency resolution: 1 kHz

Accuracy: 1 kHz

Carrier frequency drift

MT8850A measures carrier frequency drift according to the Bluetooth RF Test Specification. Measurement of frequency drift is made with the EUT in test mode, with either loopback or transmitter test mode enabled. EUT transmits longest supported packets, with a 10101010 payload to the EUT. Measurements are made with hopping off and then with hopping on. Frequency drift is measured at three defined frequencies with hopping off and every frequency with hopping on.

Link conditions:

Hopping: OFF and ON

Test mode: ON

Loopback or TX mode

Payload: 10101010

Packet type: all supported packet lengths

Measurement:

Supported measurements: Carrier frequency drift

Number of measurement frequencies: Three with hopping off then every frequency with hopping on.

RF input measurement range: +20 dBm to -35 dBm

Frequency drift measurement range: 0 Hz to 200 kHz, and > 2000/50µs

Frequency resolution: 1 kHz

Accuracy: 1 kHz

Sensitivity - single slot packets

MT8850A measures single slot sensitivity according to the Bluetooth RF Test Specification

BER and FER are measured with the EUT in test mode and loopback on. MT8850A transmits DH1 packets, with a PRBS 9 payload to the EUT. The user can select to run the measurement with hopping on or off. Dirty transmitter conditions as defined in the Bluetooth test specifications can be enabled.

Link conditions:

Hopping: OFF or ON, user selectable

Test mode: ON

Loopback: ON

Payload: PRBS 9

Packet type: DH1

Dirty transmitter (as defined in RF test spec): ON or OFF, user selectable

Measurement:

Supported measurements: BER, total number of bit errors and FER

Number of measurement frequencies: Three with hopping off, or hopping on.

Number of measured bits: 1 to 32,768 packets (216 to 7,077,888 bits)

MT8850A transmitter output range: 0 dBm to -80 dBm, resolution 0.1 dB

BER/FER measurement range: 0.00% to 100%

BER/FER resolution: 0.01%

Dirty transmitter specification

MT8850A transmits the first 20 ms with the first set of measurement conditions, the second 20 ms with the second set of measurement conditions up to the tenth set of conditions. The cycle is then repeated until the test is complete.

Measurement conditions	Carrier frequency offset	Modulation index	Symbol timing error
1	75 kHz	0.28	-20 ppm
2	14 kHz	0.30	-20 ppm
3	-2 kHz	0.29	+20 ppm
4	1 kHz	0.32	+20 ppm
5	39 kHz	0.33	20 ppm
6	0 kHz	0.34	-20 ppm
7	-42 kHz	0.29	-20 ppm
8	74 kHz	0.31	-20 ppm
9	-19 kHz	0.28	-20 ppm
10	-75 kHz	0.35	+20 ppm

In addition to the above measurement conditions, MT8850A transmits with a sine wave, frequency modulation, with a deviation of ±25 kHz. rate 1.6 kHz, synchronized to zero phase at the packet start.

Dirty transmitter, user control; any entry in the dirty transmitter table can be edited within the following ranges;

- carrier frequency offset: 0 Hz to 100 kHz, 1 kHz resolution.
- Modulation index: 0.25 to 0.38, 0.01 resolution
- Symbol timing error: 0 ppm, +20 ppm or 20 ppm

Sensitivity - multi-slot packets

MT8850A measures multi-slot sensitivity according to the Bluetooth RF Test Specification

BER and FER are measured with the EUT in test mode and loopback on. MT8850A transmits DH5 packets (or DH3 packets if DH5 not supported by EUT), with a PRBS 9 payload to the EUT. The user can select to run the measurement with hopping on or off. Dirty transmitter conditions as defined in the Bluetooth test specifications can be enabled.

Link conditions:

Hopping: OFF or ON, user selectable

Test mode: ON

Loopback: ON

Payload: PRBS 9

Packet type: DH5 (or DH3 packets if DH5 not supported by EUT)

Dirty transmitter (as defined in RF test spec): ON or OFF, user selectable

Measurement:

Supported measurements: BER, total number of bit errors and FER Number of measurement frequencies: Three with hopping off, or hopping on.

Number of measured bits: 1 to 32,768 packets (for DH3, 1,464 to 47,972,352 bits), (for DH5, 2,712 to 88,866,816 bits).

MT8850A transmitter output range: 0 dBm to -80 dBm, 0.1 dB resolution

BER/FER measurement range: 0.00% to 100%

BER/FER resolution: 0.01%

Dirty transmitter specification: as for single-slot sensitivity section except; in addition to the measurement condition table, MT8850A transmits with a sine wave, frequency modulation, with a deviation of ±40 kHz, rate 500 Hz (3 slots) or 300 Hz (5 slots), synchronized to zero phase at the packet start.

Maximum input level

MT8850A measures BER and FER at the EUT maximum input level according to the Bluetooth RF Test Specification. Measurement is made with the EUT in test mode, loopback enabled and hopping off. MT8850A transmits the DH1 packets with a PRBS 9 payload. The MT8850A transmitter level is set so that the EUT receiver input level is -20 dBm. BER and FER are measured at three defined frequencies.

Link conditions

Hopping: OFF

Test mode: ON

Loopback: ON

Payload: PRBS 9

Packet type: DH1

Measurement:

Supported measurements: BER and FER for -20 dBm at receiver input

Number of measurement frequencies: Three, default to qualification specification or user defined

Number of measured bits: 1 to 32,768 packets (216 - 7,077,888 bits)

Transmitter power settable range: 0 dBm to -80 dBm

Resolution: 0.1 dB

MT8850A signal generator

Frequency

Frequency range:	2.40 to 2.5 GHz
Frequency resolution	1 kHz
Frequency accuracy	As frequency standard ± 25 Hz
Settling time (when hopping)	<160µs to ± 75 kHz during the establishing of a link. When a link has been established and the EUT been placed into test mode, the MT8850A transmitter is pre-tuned to ±1 kHz of the nominal channel frequency at the beginning of its data burst for both fixed frequency or hopping measurements.

Level

Amplitude range	0 dBm to -80 dBm
Amplitude accuracy	±1 dB
Amplitude resolution	±0.1 dB
Output impedance	50 Ohm (nominal)
Output VSWR	1.5:1 (typically 1.3)
	Adjacent channels 3 or higher -40 dBc
Spurious	30 MHz to 1 GHz; -36 dBc
	1 GHz to 12 GHz; -30 dBc
	1.8 GHz to 1.9 GHz; -47 dBc
	5.15 GHz to,5.3 GHZ; -47 dBc
	or -80 dBm, whichever is greater

Modulation

Modulation	GFSK
Modulation index	Variable, 0.25 to 0.38
	(125 kHz to 190 kHz)
Mod index resolution	0.01
Mod index accuracy	1 kHz
Baseband filter	BT=0.5

MT8850A measuring receiver

Frequency

Range	2.40 to 2.5 GHz
Resolution	1 kHz
Settling time	<160µs to 75 kHz during the establishment of a link. When a link has been established and the EUT has been placed into test mode, the MT8850A receiver is pre-tuned to ±1 kHz of the nominal channel frequency.
Accuracy	As frequency standard ± 25 Hz
Measurement channel bandwidth	3 MHz

Level

Range	+22 dBm to -35 dBm average power
Power measurement accuracy	±1 dB (+20 dBm to -35 dBm)
Input VSWR	1.5:1
Damage level	+25 dBm
Resolution	0.1 dB

Modulation

Modulation	GFSK
Deviation measurement range	0 to 350 kHz peak
Accuracy	1 kHz

EUT control interface

Provides HCI commands to EUT through a standard RS 232 interface. Interface meets requirements of Bluetooth V1.1 specification for HCI UART transport layer. Cable supplied.

Frequency standard

Frequency	10 MHz
Accuracy	±0.5 ppm at 25°C
Temperature Stability	±0.5 ppm, -10°C to +85°C
Aging (1st year)	±1.0 ppm
Aging (over 10 years)	±2.5 ppm, including year 1

Rear panel connectors

External frequency standard input	Rear panel BNC socket, 50Ω 1 volt
Output 1	TTL high when MT8850A TX on
Output 2	TTL high when MT8850A RX active
Input 1	For service use only

GPIB

IEE 488.2. Offers full instrument control as standard. User can also read the 4 x over-sampled magnitude and frequency values of each data bit in the last measured packet.

RS 232

RS 232 interface offering full instrument control as standard

Power requirements

Supply	85 to 264 Volts AC
	47 to 63 Hz
	150 VA MAX

Environmental

Operating temperature	5 to +40°C
Operating humidity	20% to 75%
Safety	Complies with IEC 1010-1
EMC	Conforms to the protection requirements of EEC Council Directive 89/336/EEC.

Size and weight

Dimensions	216.5 mm x 88 mm x 380 mm
Weight	<3.45 kg

Ordering information

MT8850A Bluetooth Test Set

Included accessories:

- Power cord for destination country
- Operation manual
- RS232 cable for firmware update
- Remote control programming manual
- Certificate of calibration
- EUT control interface lead (RS232)

Options and accessories:

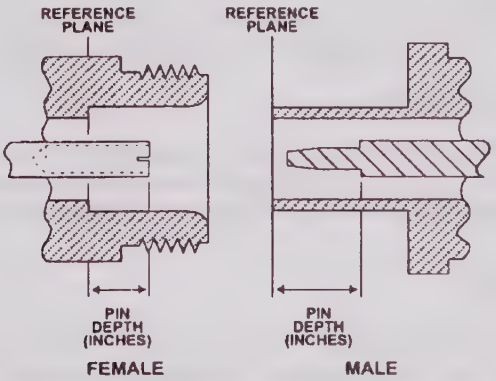
- MT8850A -01 Rack mount kit, single unit
- MT8850A -03 Rack mount kit, side by side
- MT8850A-06 rear mount RF and EUT connectors
- MT8850A-10 Bluetooth antenna and adapter
- MT8850A-20 Spare EUT control interface lead (RS 232)
- MT8850A-30 Extra Operation and Remote control programming manual
- D41310 Soft carry case
- 760-209 Hard transit case

Appendix C. Connector Care and Handling

Follow the precautions listed below when handling or connecting cables. Complying with these precautions will guarantee longer component life and less equipment down time due to connector or device failure. Also, such compliance will ensure that

Beware of destructive pin depth mating connectors

Destructive pin depth of mating connectors is the major cause of failure in the field. When an RF component is mated with a connector having a destructive pin depth, damage will usually occur to the RF component connector. A destructive pin depth is one that is too long in respect to the reference plane of the connector (see figure below).



N connector pin depth definition

The center pin of a precision RF component connector has a precision tolerance. The mating connectors of various RF components may not be precision types. Consequently, the center pins of these devices may not have the proper pin depth. The pin depth of DUT connectors should be measured to assure compatibility before attempting to mate them with Power Sensor connectors. An Anritsu Pin Depth Gauge or equivalent can be used for this purpose.

Pin depth gauge

If the measured connector is out of tolerance in the "+" region, the center pin is too long (see Allowable DUT connector pin depth table below). Mating under this condition will likely damage the precision RF component connector. If the test device connector measures out of tolerance in the "-" region, the center pin is too short. This should not cause damage, but it will result in a poor connection and a consequent degradation in performance.

DUT Connector Type	Anritsu Gauging Set Model	Pin Depth (inches)	Pin Depth Gauge Reading
N - Male N - Female	01-163	207 -0.000 +0.030	207 +0.000 -0.030
WSMA - Male WSMA - Female 3.5 mm - Male 3.5 mm - Female	01-162	-0.000 -0.010	Same as pin depth

Allowable DUT connector pin depth

Avoid over torquing connectors

Over torquing connectors is destructive; it may damage the connector center pin. Finger-tight is usually sufficient for Type N connectors. *Always* use a connector torque wrench (8 inch-pounds) when tightening WSMA, K or V type connectors. *Never use pliers to tighten connectors.*

Avoid mechanical shock

Precision connectors are designed to withstand years of normal bench handling. However, do not drop or otherwise treat them roughly. Mechanical shock will significantly reduce their service life.

Do not disturb Teflon tuning washers on connector center pins

The center conductor on many RF component connectors contains a small Teflon washer that is located near the point of mating. This washer compensates for minor impedance discontinuities at the interface. *Do not disturb this washer.* The location of the washer is critical to the performance of the RF component.

Cleaning connectors

The precise geometry that makes possible the RF component's high performance can easily be disturbed by dirt and other contamination adhering to the connector interfaces. When not in use, keep the connectors covered.

To clean the connector interfaces, use a clean cotton swab that has been dampened with denatured alcohol.

> **NOTE:** Most cotton swabs are too large to fit in the smaller connector types. In these cases, it is necessary to peel off most of the cotton and then twist the remaining cotton tight. Be sure that the remaining cotton does not get stuck in the connector. Cotton swabs of the appropriate size can be purchased through a medical laboratory-type supply center.

The following are some important tips on cleaning connectors:

- Use only denatured alcohol as a cleaning solvent
- Do not use excessive amounts of alcohol as prolonged drying of the connector may be required
- Never put lateral pressure on the center pin of the connector
- If installed, do not disturb the Teflon washer on the center conductor pin

- Verify that no cotton or other foreign material remains in the connector after cleaning it
- If available, use compressed air to remove foreign particles and to dry the connector
- After cleaning, verify that the center pin has not been bent or damaged.

Index

A

about Bluetooth, 2-1
AC line power, 3-1
accessing script menu, 8-2
accessories, 1-1, B-13
activate test mode, 2-2
advanced diagnostic tools, 2-3
alpha/numeric keypad, 5-6
arrow keys, 5-5, 7-15, 7-16
assembly procedure, 3-3
average and peak power, B-2

B

back key, 5-5
baud rate, 7-1, 7-5, 7-8
BlueSuite support software, 2-3
Bluetooth address, 2-2, 6-2, 7-1, 7-3, 8-5, 8-25
Bluetooth link, 2-2
Bluetooth RF test specification, 2-2, 8-8, 8-12, 8-14, 8-15, 8-17, 8-19, B-2, B-3, B-4, B-6, B-7, B-8, B-9
bootload, 7-16
box icon, 7-10
BT address, 2-2, 6-2, 7-1, 7-3, 8-5, 8-25

C

carrier drift test, 8-14
carrier drift test results, 8-28
carrier frequency drift, 2-2, 8-14, 8-15, B-6
carrier frequency offset, 2-2
certificate of calibration, 1-1
change access password, 8-3
change password, 8-4
changing a frequency, 8-9, 8-11, 8-13, 8-15, 8-17, 8-19, 8-22, 8-23
changing name of a script, 8-3
channel number, 7-2, 7-11
channel pattern, 7-10
choosing screen entries, 5-5
cleaning connectors, C-2
clear key, 5-5
common name, 7-1, 7-6, 8-25
config hard key, 5-4
configuring MT8850A, 5-4, 7-1
connections, 2-1, 4-1
connector care, C-1
connector handling, C-1
conventions, 5-3
cooling, 3-2
creating test programs, 2-2
customizing test measurements, 2-2
cycles, 8-11, 8-22

D

data length, 7-1, 7-5, 7-8
DC power, 3-1
deviation rate, 7-12
dirty parameters table, 8-18, 8-20
dirty transmitter, 8-17, 8-19, 8-20, B-1, B-7, B-8
dirty transmitter table, 2-2, 8-16, 8-19, B-8
display contrast, 7-9
display frequency, 7-2, 7-14
drift selection, 8-18, 8-20

E

editing tests, 2-2
Ellipse icon, 7-4
entry error bleep, 5-4, 6-1, 7-1, 7-9
environmental requirements, 3-2, 3-6
environmental specifications, 3-2, 3-6, B-12
error codes, A-2
error message, 2-2, A-1, A-2, A-4, A-5, A-6, A-7
EUT address, 7-1, 7-3, 7-6, 8-25, A-3
EUT control, 1-1, 6-1, 7-1, 7-5, A-4, B-11, B-13
EUT control interface, 1-1, 6-1, B-11, B-13
EUT HCI interface, 2-2
EUT source, 7-6, 8-25

F

factory set password, 8-4
features, 2-1
fixed offset, 8-7
foot removal, 3-3, 3-4
frequency accuracy, 2-2, 8-12
frequency entry, 8-7
frequency modulation, 2-1
frequency standard, B-12
frequency values, 8-7
front panel, 4-1, 5-1, 5-3, 6-1

front panel connectors, 4-1
front panel controls, 5-1
fuse protection, 3-1

G

Getting started, 6-1
GPIB address, 7-1, 7-8
GPIB indicators, 7-1, 7-9
GPIB interface, 2-2
GPIB serial connecting port, 7-8
grounding, 3-1

H

hard keys, 5-4
HCI EUT errors, A-2
hexadecimal address, 5-6
hopping, 8-8, 8-9, 8-12, 8-13, 8-16, 8-17, 8-20, B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9
hopping test mode, 8-9, 8-13, 8-16
humidity, 3-2, 3-6, B-12

I

identification number, 1-1
identity of MT8850A, 7-7
IEE 488.2, B-12
individual test, 8-2, 8-5, 8-8
information message, 1-1, A-1
initial carrier frequency tolerance, B-5
initial carrier test, 8-12
initial carrier test results, 8-28
initiate link, 2-2
installation, 1-1, 3-1, 3-2

K

key click, 5-4, 6-1, 7-1, 7-9

L

lock script, 8-3
longest supported packets, B-2, B-4, B-6
longest supported payload length, B-2
loop continuously, 7-2, 7-14
loop count, 7-2, 7-14
loop stop on failure, 7-2, 7-14
loop/stop hard key, 5-4
loss entry, 8-7
loss values, 8-7

M

making a link, 2-2
maximum input level, 1
maximum input power, 2
maximum input power results, 8-31
measuring power, 2-1
measuring receiver, 7-11, 8-11
menu entries, 7-1, 8-1
menu features, 5-1
menu functions, 5-1
message clear conditions, A-3
message display conditions, A-3
message priorities, A-2
message type, A-1, A-2
models, 1-1
modulating bit pattern, 7-11
modulation characteristics, B-4
modulation index, 2-2, 5-4, 6-1, 7-2, 7-11, 7-12, 8-2, 8-8, 8-18, 8-20, 8-21, 8-22, 8-30, B-7, B-8, B-10
modulation index test, 8-21
modulation index test results, 8-30
modulation rate, 7-12
multi-slot sensitivity test, 8-19
multi-slot sensitivity test results, 8-30

N

national standard, 2-1, 2-2
null packets mode, 6-3, 7-2, 7-12, 7-13, A-2, A-4
number of cycles, 8-11, 8-22
number of packets, 8-9
number of responses, 7-6
number of seconds, 7-6

O

obtaining results, 8-1, 8-5
offset frequency, 8-18, 8-20
offset table, 8-6, 8-23
offset table edit, 8-7
offset value, 8-6, 8-7, 8-23
operation, ii, iii, 1-1, 3-1, 3-2, 7-8, 7-12, 7-14, 7-15, 7-17, A-1
optional features, 7-4
options, 1-1, 3-1, 3-6, 5-3, 6-1, 8-8
ordering information, B-13
output power specification, 8-2, 8-8, 8-9, 8-27, 8-28, 8-29, 8-30, 8-31, B-2
output power test, 8-8
output power test results, 8-27

P

packet lengths, 8-16
packet type, 8-9, 8-11, 8-22, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9
parity, 7-8
path loss table, 8-7
path offset, 8-7
perform measurements, 2-2
physical connections, 4-1
pin depth, C-1, C-2
pin depth gauge, C-1, C-2
poll packets, 6-3, 7-12, 8-14
power control specification, 7-4, 8-2, 8-8, 8-10, 8-11, 8-27, B-3
power control test, 8-10
power control test results, 8-27
power level range, 7-11
power on procedure, 5-1
power requirements, 3-1, B-12
power-on self test (POST), 3-1, 5-3, 6-1
power-on-procedure, 5-3
preparing for use, 6-1
preset hard key, 5-4
product overview, 2-1

R

rack mounting, 3-2
rack mounting installation, 3-2
radio interface, 7-6
range hold, 7-11
rear panel connectors, 4-1, B-12
receiver sensitivity, 2-1, 2-2, 7-13
receiver sensitivity measurements, 2-2
receiver tests specification, B-1
reduced pattern, 7-10
reference Bluetooth transceiver, 2-2
remote control, 2-2, B-13
report results, 2-2
RF power, 7-2, 7-11, 7-13
RF test specification, 2-2, B-2, B-3, B-4, B-6, B-7, B-8, B-9
rotating paddle icon, A-3
RS 232 interface, 2-2, B-11, B-12
RS232 mode, 7-8
RS232 serial connecting port, 7-8
run hard key, 5-4
running a single test, 6-2, 8-5, 8-26
running scripted tests, 6-1, 8-5

S

safety, A-1, A-4, B-12
screen display and sound, 7-9
script hard key, 5-4
script menu, 5-4, 8-1, 8-2, 8-5
sel. key, 5-5
selected value, 7-10
sensitivity - multi-slot packets, B-8
sensitivity - single slot packets, B-7
sequence of tests, 8-1
serial communication, 7-5
serial number, 7-7
set password, 8-3, 8-4
setting up EUT, 7-3, 7-5
shipping information, 3-1
signal generator, 7-10, B-10
single slot sensitivity results, 8-29
single slot sensitivity test, 8-16, 8-17
single test mode, 2-2, 5-4
size and weight, 2-2, B-13
slot sensitivity, 8-2, 8-8, 8-16, 8-19, 8-29, B-7
soft keys, 5-4, 5-5
software modules, 7-7
software upgrade, 2-2, 7-17
software version number, 7-7
specific instrument features, A-1
specification, 2-2, A-5, B-1
spurious emissions tests, 2-3
standard channel pattern, 7-10
status message, 7-9, A-1, A-2
STE, 8-18, 8-20
stop, 7-1, 7-5, 7-8, 8-25, A-3
storage and shipment, 3-6
storage information, 3-1
stress conditions, 2-2
supported features, 7-1, 7-4
symbol timing error, 2-2, 8-18, 8-20
system interfaces, 7-8, 7-9

T

temperature range, 3-2
test results, 6-3, 8-26, 8-27, 8-28, 8-30, 8-31
test script operation, 7-11, 7-14
test scripts, 2-1, 2-2, 7-1, 7-14
test type, 8-9, 8-10, 8-11, 8-13, 8-16, 8-22
testing capabilities, 2-1
tests defined, 8-1
text message, A-1, A-2
tools required, 3-3
top-line messages, A-1
transmission power level, 7-13
transmission power offset value, 8-23
transmitter test specification, B-1
TX output spectrum, 2-3

TX power level, 7-2, 7-13

U

unlock script, 8-3
unselected value, 7-10
unsupported features, 7-4
updating software, 7-16
user friendly name, 7-1, 7-3, 7-6, 7-7, 8-1, 8-25
user interface, 2-1, 7-9
user text display, 7-1, 7-9

W

warning message, A-1, A-2, A-4, A-5

Anritsu

ANRITSU CORPORATION 5-10-27, Minamiazabu, Minato-ku, Tokyo 106, Japan Phone: +81-3-3446-1111 Telex: J34372 Fax: +81-3-3442-0235 International Subsidiaries	U.K. **ANRITSU LTD.** Capability Green, Luton, Bedfordshire LU1 3LU, United Kingdom Phone: +44-1582-433200 Fax: +44-1582-731303	Sweden ANRITSU AB Botvid Center 145 84 Stockholm, Sweden Phone: +46-853470700 Fax: +46-853470730 Fax: +91-11-685-2275
U.S.A. **ANRITSU COMPANY** 1155 E. Collins Blvd. Richardson, TX 75081, U.S.A. Phone: +1-800-ANRITSU Fax: +1-972-671-1877	Germany **ANRITSU GmbH** Grafenberger Alee 54-56, D-40237 Düsseldorf 1, Germany Phone: +33-1-60-92-15-50 Fax: +33-1-64-46-10-65	Singapore ANRITSU PTE LTD. 6, New Industrial Rd, #06-01/02, Hoe Huat Industrial Building, Singapore 536199 Phone: +65-282-2400 Fax: +65282-2533
Canada **ANRITSU Instruments LTD.** 4-205 Matheson Blvd. East, Mississauga Ontario, L4Z 3E3, Canada Phone: +1-905-890-7799 Fax: +1-905-890-2290	France **ANRITSU SA** 9, Avenue du Quebec, ZA de Courtaboeuf 91951 Les Ullis Cedex, France Phone: +33-1-60-92-15-50 Fax: +33-1-64-46-10-65	Hong Kong ANRITSU COMPANY LTD. Suite 812, 8/F, Chinachem Golden Plaza, 77 Mody Road Tsimshatsui East, Kowloon, Hong Kong, China Phone:+852-2301-4980 Fax: +852-2301-3545
Brazil **ANRITSU ELETRONICA LTDA.** Praia de Botafogo 440, Sala 2401 CEP 22250-040, Rio de Janeiro, RJ, Brasil Phone: +55-21-527-6922 Fax: +55-21-537-1456	Italy **ANRITSU SpA** Via Elio Vittorini, 129, 00144 Roma EUR, Italy Phone: +39-6-502-2666 Fax: +39-6-502-2425 Fax: +968-791697	Korea ANRITSU CORPORATION LTD. Room No. 901, Daeo Bldg, 26-5, Yeoido-Dong, Young Deung Po-Ku, Seoul, Korea Phone: +82-2-782-7151 to 7156 Fax: +82-2-782-

ANRITSU

ANRITSU CORPORATION

U.S.A.
ANRITSU COMPANY

U.K.
ANRITSU LTD.

Germany
ANRITSU GmbH

France
ANRITSU S.A

Sweden
ANRITSU AB

MP MASTER
MA34507